PREFACE

This supplement to Dr. G. A. Boulenger's Fauna of the Malay Peninsula (Reptilia and Batrachia) has been compiled at the suggestion of Mr. C. Boden Kloss, Director of Museums, Straits Settlements and Federated Malay States. It contains descriptions of all genera and species that have been discovered in the Peninsula since the publication of Boulenger's volume in 1912, together with references to all fresh information dealing with the region. The changes in nomenclature are included, and at the end is a bibliography of the recent literature upon the subject.

Altogether 1 species of turtle, 16 of lizards, 12 of snakes and 18 of amphibians have been added to the fauna in the last fifteen years. The total number of species, however, has not been augmented to that extent. Several have been suppressed while others have not been included as the evidence for their occurrence in the Peninsula is believed to be incorrect. The majority of the additions are from the northern part of the Peninsula, a region which was but little investigated prior to 1912. This country—from Lat. 6°. N., northwards to the Isthmus of Kra—is now probably as well-known herpetologically as the southern part, although it is likely that some of the Indo-Chinese forms that extend their range to just south of the Isthmus remain to be discovered. The expedition of Messrs. Robinson and Kloss to the northern part of the peninsula in 1919, the extensive collections made by Mr. C. J. Aagaard at Bangnara in Patani and the material obtained by myself or by my native collectors during my residence in Siam, are the chief sources of this additional knowledge.

An interesting problem in geographical distribution is connected with a number of species which are to be found in the northern part of the Peninsula and in the Malay Archipelago, but not in the southern part of the Peninsula. The reason for this discontinuous distribution has not been explained. It will be convenient here to record the names of these species.

CROCODILES

Crocodylus siamensis

CHELONIANS

Geoclemys subtrijuga

LIZARDS

Gonocephalus doriae, Draco taeniopterus, Tropidophorus (genus).

SNAKES

Thalassophina viperina, Thalassophis anomalus, Amblycephalus carinatus, Amblycephalus laevis, Agkistrodon rhodostoma.

AMPHIBIANS

Rana cancrivora, Rhacophorus colletti, Philautus bimaculatus, Philautus horridus, Bufo borbonica.

That sea snakes, which are not dependent upon geographical changes in the same way as terrestrial reptiles should be included is remarkable. The recent discovery of Russell's Viper by Dunn on the Island of Komodo and by Mertens on Flores is an instance of even more marked discontinuous distribution. On the Asiatic mainland this snake has not been met with south of Bangkok.

Among the problems that more especially require attention are the exact number of species of *Trionyx* among the Chelonians, of *Draco*, *Gonocephalus*, *Varanus* and *Lygosoma* among the lizards, and of *Oligodon*, *Gongylosoma* and *Amblycephalus* among the snakes.

The larval forms of many of the amphibians have been described in recent years, but we are still in almost complete ignorance of the life-histories of the tree-frogs (genera *Rhacophorus* and *Philautus*) and of the brevicipitid frogs of the genera *Kalophrynus* and *Phrynella*. The existence of a fresh-water crocodile also needs confirmation.

A new form of *Rana cancrivora* is proposed in this paper (p. 96).

MALCOLM SMITH.

LONDON,
November, 1929.

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CLASS REPTILIA

Order **EMYDOSAURIA**

Family **Crocodylidae**

Genus **Tomistoma**

Tomistoma schlegelii, Boulenger, p. 3.

Genus **Crocodylus**

The original spelling of Laurenti is retained.

Crocodylus porosus.

Crocodilus porosus, Boulenger, p. 4.

Crocodylus siamensis.

Crocodilus palustris, Boulenger, p. 5; Laidlaw, P. Z. S., 1901, p. 581; Annandale and Robinson, Fascic. Malay. Zool., 1904, p. 148.

The fresh-water crocodile of the Malay Peninsula—as distinct from *C. porosus* which is marine or estuarine in its habits—is *Crocodylus siamensis*. I am only aware of one authentic specimen in existence and that is the one obtained by the Skeat expedition at Biserat, Jalor, Patani, and now in the University Museum of Zoology at Cambridge. Through the kindness of the Superintendent it has recently been forwarded to me for examination. It is a juvenile, 1 metre 375 mm. in length and is an undoubted example of the Siamese Crocodile. It can be distinguished at once from its Indian ally, *C. palustris*, by having only four teeth in the premaxillary bone instead of five, by the premaxillo-maxillary suture on the palate being curved backwards instead of passing straight across the jaw, and by the longer and narrower snout.

It is most probable that the *C. palustris* recorded from Java is also *C. siamensis*. The distribution of the two species will then more closely accord with our knowledge of geographical distribution, *C. palustris* being confined to the Indian region, *C. siamensis* to Siam, French Indo-China, the northern part of the Malay Peninsula and Java.

Order **TESTUDINATA**

Chelonia, p. 6.

Family **Trionychidae**

KEY TO THE GENERA

1. Orbit nearer the temporal than the nasal fossa; postorbital arch narrower than the orbit; bony choanae between the orbits; proboscis long.
   - *a*. Last pair of costal plates in contact on the median line; median processes of hypoplastron present; head moderate … *Trionyx*.
   - *b*. All the costal plates separated by the neural plates; median processes of hypoplastron absent; head very large … … *Dogania*.
2. Orbit nearer the nasal than the temporal fossa; postorbital arch broad; proboscis very short … … … *Pelochelys*.
3. Orbit much nearer the nasal than the temporal fossa; postorbital arch very broad; proboscis moderate … … … *Chitra*.

Genus **Trionyx**

Trionyx (part), p. 8.

Trionyx, Siebenrock, SB. Akad. Wiss. Wien, Vol. 116, p. 1764 (1909).

Amyda, Stejneger, Science (n.s.) XXI, p. 228 (1905) and Herpet. Japan. p. 514 (1907).

T. subplanus is placed in a genus by itself.

Major Stanley Flower has pointed out to me that Geoffroy, in erecting his genus *Trionyx* (Ann. Mus. Hist. Nat. Paris, XIV, (1809) clearly intended *Trionyx aegyptiacus* (=*T. triunguis* Forskal) to be the type. On page 20 of his article he states "Le trionyx d'Egypte (*T. Aegyptiacus*), representé planche I, nous donnons une idée exacte du port et des caractères generiques des trionyx, nous nous sommes bornés, dans les planches suivantes, a faire figurer les seules parties caracteristiques dos autres especes, telle que leurs carapaces et leur plastrons." Nothing could be more definite than this, and the use of the name *Trionyx* for the genus which contains the majority of the soft-shelled turtles is therefore correct.

Trionyx hurum.

Boulenger, p. 9; Robinson and Kloss, J. F. M. S. Mus., V, p. 154 (1915).

Boulenger recorded this turtle from the Malay Peninsula with doubt. Robinson and Kloss (1915) have since recorded it from Bandon, their identification being made on a head only.

Trionyx phayrii, Boulenger, p. 10.

Trionyx cartilagineus, Boulenger, p. 11

Genus **Dogania**

Trionyx (part), p. 9.

Dogania Gray, Cat. Tort. Brit. Mus., 1844, p. 49; Baur, Proc. Amer. Philos. Soc., 1893, XXXI, p. 220; Stejneger, Science, 1905, XXI, p. 229; Siebenrock. Zool. Jahr. Suppl. 1909, X, p. 605.

Orbits nearer the temporal than the nasal fossae; postorbital arch narrow, forming a keel exteriorly; bony choanae between the orbits. Eight neural plates separating the eight pairs of costal plates. Plastral callosities absent or feebly developed; no median continuation of the hypoplastron. One species.

Dogania subplana.

Trionyx subplanus, Boulenger, p. 9.

Genus **Pelochelys**

Pelochelys bibroni.

Pelochelys cantoris, Boulenger, p. 11.

Triinyx (Gymnopus) Bibroni Owen. Cat. Osteol. ser. R. Coll. Surg., I. 1853, p. 185.

After comparing Gray's type of *Pelochelys cantorii* (a half-grown, stuffed specimen and the skull which has been extracted from it) with Owen's type of *Trionyx bibroni* (the skull and bony carapace of a somewhat larger individual) I have no hesitation in uniting the two. Owen's name therefore has priority.

The statement that specimens of this turtle are in the local museums from the coasts of Perak and Selangor is not correct. Nor as far as my experience goes is it marine in its habits. It is not uncommon in Siam in the Chao Phya and the Ratburi rivers, where its flesh is esteemed by the natives and is said to be superior to that of *Trionyx cartilagineus*. All the specimens that I have seen were caught well above tidal limits, and I have satisfied myself after careful enquiry that it is not found at the mouths of these rivers or in the Gulf of Siam.

Genus **Chitra**

***Chitra* Gray, Cat. Tort., p. 49 (1844); Boulenger, Fauna Brit. Ind.,** p. 16 (1890), Siebenrock, Zool. Jahrb. Suppl., 1909, p. 608.

Neural plates well developed; a single neural between the first pair of costals; a median process upon the hypoplastron. Bony choanae behind the orbits, which are situated at the anterior extremity of the skull; postorbital arch at least twice as broad as the diameter of the orbit.

A single species.

Chitra indica.

Chitra indica Gray, Cat. Tort., p. 49 (1844); Boulenger, Cat. Chelon. Brit. Mus., p. 264, 1889, fig. (skull); and Fauna Brit. Ind., p. 16 (1890); Annandale, Rec. Ind. Mus., VII, 1912, p. 169, fig. (skull and branchial skeleton); M. A. Smith, Journ. F. M. S. Mus., X, 1922, p. 264.

Eight pairs of costal plates, the last well developed and forming a median suture; a single neural between the first pair of costals; plates coarsely pitted and vermiculate. Entoplastron forming an acute angle; epiplastra short, widely separated; four plastral callosities, well developed. Head small, snout extremely short; interorbital space considerably narrower than the greatest diameter of the orbit.

Colour. Olive or pale greenish above, whitish below; the dorsal disc with numerous pale broad lines and angular markings, which are often edged with black. Head and neck above with longitudinal light, dark-edged streaks.

The specimen obtained in the Tahan river, Pahang, by the F. M. S. Museums, and two more obtained by me at Kanburi, Ratburi river, peninsular Siam are coloured as above. In the absence of any adult examples from India to compare them with I am unable to say if any difference exists, but it would appear that the adult turtle in India lacks the quaint angular markings upon the disc which characterize the peninsular form. Gray's figure of a juvenile (Illus. Ind. Zool., I, pl. LXXX, 1832, and Günther's plate of a young specimen (Rept. Brit. India) shew somewhat similar markings, but Dr. Annandale once told me that none of the adult specimens of *Chitra indica* that he had examined had any pattern at all upon the disc.

Family **Testudinidae**

No new species have been added since the publication of Boulenger's volume and it is unlikely that any more will be discovered in the Malay Peninsula. Several changes in generic titles are to be noted. As pointed out by Stejneger the names *Geoemyda* and *Damonia* are inapplicable and they are now replaced by *Heosemys* and *Geoclemys* respectively. The monotypic genus *Notochelys* has been revived by Siebenrock for the species called by Boulenger *Cyclemys platynota* and, as pointed out by me in 1917, *Cyclemys annandalei* in having the plastron immovably fixed to the carapace by suture and in having an incomplete bony temporal arch, is nearer to *Heosemys* (= *Geoemyda*) than to *Cyclemys*. The genus *Hieremys* is proposed for it.

KEY TO THE GENERA

I. Limbs club-shaped; alveolar surface of upper jaw with a median ridge; a bony temporal arch ... ... *Testudo.*

II. Digits distinct, with at least a rudiment of web; alveolar surface of upper jaw without median ridge.

A. Plastron united to carapace by suture, immovable.

No bony temporal arch; alveolar surfaces of jaws narrow; choanae on a level with the front of the eyes; margin of jaws smooth or feebly dentate ... ... *Heosemys.*

Bony temporal arch incomplete posteriorly; alveolar surfaces of jaws broad; choanae on a level with the middle of the eyes; margin of jaws strongly denticulate ... *Hieremys.*

A bony temporal arch; alveolar surfaces of jaws moderately broad; choanae on a level with the front of the eyes ... *Bellia.*

A bony temporal arch; alveolar surfaces of jaws very broad; choanae behind the level of the eyes ... ... *Geoclemys.*

B. Plastron connected to carapace by ligamentous suture; a bony temporal arch.

Five vertebral shields; skin of head undivided *Cyclemys*

Six or seven vertebral shields; skin of posterior part of head divided ... *Notochelys.*

III. Digits distinct, entirely webbed; alveolar surface of upper jaw with one or two median ridges.

A. Fore-limb with five claws.

Edge of jaws not denticulated; skin of hinder part of head divided into small shields ... *Orlitia.*

Edge of jaws denticulated; skin of hinder part of head undivided ... ... *Callagur.*

B. Fore-limb with four claws ... *Batagur.*

Genus **Testudo**

KEY TO THE SPECIES

Supracaudal shield single, more or less incurved ... ... *elongata.*

Two supracaudal shields embracing a deep notch.

Pectoral shields in contact with one another; carapace brownish or yellowish, head in the adult yellowish ... ... *impressa.*

Pectoral shields widely separated; carapace blackish or dark brown, head in the adult blackish ... ... *emys.*

Testudo elongata, Boulenger, p. 3.

Testudo impressa.

Geoemyda impressa, Gunther, P.Z.S., 1882, p. 343, figs. 1—3.
Testudo impressa, M. A. Smith, Journ. N.H.S. Siam, IV, 1922, p. 204 and Journ. F. M. S. Mus., X, 1922, p. 264.
Testudo latinuchalis, Boulenger, p. 15.

A full synonymy of this species has been given by me in the Journal of the Natural History of Siam.

The character of the vertebral shields as given by Boulenger to distinguish this species from *T. emys* is not always reliable. The following will serve to distinguish the two:—

T. emys	*T. impressa*
Basi-sphenoid with a well marked ridge on its inferior surface.	Basi-sphenoid without ridge.
Median ridge on alveolar surface of upper jaw strongly developed.	Median ridge feebly developed.
Pectoral shields usually widely separated from one another.	Pectoral shields in contact with one another.
Shell yellowish or pale brown, dark brown or black at the margins of the shields.	Shell dark brown or blackish.
Head of the adult yellow.	Head of the adult blackish.
Length of shell in a straight line 270 mm.	Length of shell 520 mm.

A specimen of *T. impressa* was obtained on Fraser's Hill in 1922.

Testudo emys, Boulenger, p. 15.

Genus **Heosemys**

Geoemyda, p. 16.

Heosemys, Stejneger, P. Biol. Soc. Washington, 15, p. 238 (1902); Siebenrock, Zool. Jahrb. Supp. 10, p. 506 (1909).

As shewn by Stejneger (1902), *Testudo spengleri* is type of the genus *Geoemyda* and that name cannot therefore be used for the genus which includes *spinosa* and *grandis*.

Heosemys spinosa.

Geoemyda spinosa, Boulenger, p. 17.

The species has been found in the Nakon Sritamarat mountains, Peninsular Siam. Miss Cochran (Bull. U. S. Nat. Mus., in press) records two specimens collected in Peninsular Siam at Ronpibun and Pran respectively. They are the most northerly authentic records for the species.

Heosemys grandis.

Geoemyda grandis, Boulenger, p. 17.

I have seen specimens from Bangnara, Patani, and from the neighbourhood of Chumporn.

Genus **Hieremys**

Cyclemys (part), p. 18.

M. A. Smith, Journ. N. H. S. Siam, II, 1916, p. 50.

Skull with an incomplete bony temporal arch. Alveolar surface of jaws very broad, completely covering in the posterior nares inferiorly; horny margin of jaw strongly dentate. Plastron united to carapace by suture. Digits with a broad web.

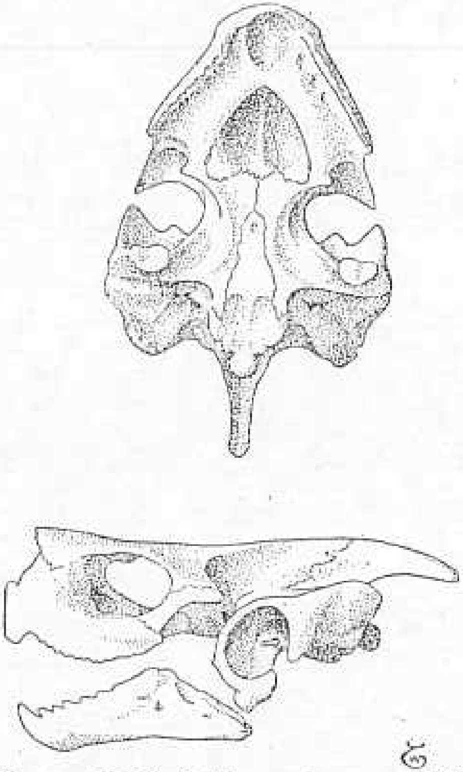

Fig. 1. Skull of *Hieremys annandalei*.

Hieremys annandalii.

Cyclemys annandalii, Boulenger, p. 19.
Hieremys annandalei, M. A. Smith, Journ. N.H.S. Siam, II, 1916, p. 50.

Range. Siam (Patani and neighbourhood of Bangkok); Cochin-China.

Genus **Siebenrockiella**

Bellia, p. 22.

Bellia (not of Milne Edwards, 1848), Gray, P.Z.S., 1869, p. 197.

Siebenrockiella Lindholm, Zool. Anz. Leipzig, Bd. 81 (11/12), 1929, p. 280.

Siebenrockiella crassicollis.

Bellia crassicollis, Boulenger, p. 23.

Genus **Geoclemys**

Damonia, p. 23.

Geoclemys (part), Gray, Cat. Shield Rept., I, p. 17 (1855); Stejneger, Herpet. Japan, p. 496, 1907; Siebenrock, Zool. Jahrb., supp. 10, p. 476 (1909).

As shown by Stejneger (1907) *Geoclemys* is the correct name for the genus.

Geoclemys subtrijuga.

Damonia subtrijuga, Boulenger, p. 23.

Genus **Cyclemys**

Cyclemys (part), p. 18.

KEY TO THE SPECIES

Plastron notched posteriorly; posterior margin of carapace serrated ... ... *dentata*.

Plastron not notched posteriorly; posterior margin of carapace not serrated ... ... *amboinensis*.

Cyclemys dentata.

Emys dentata (part.) Gray, Syn. Rept., 1831. *errata*, correction of *dhor* on page 20.

Cyclemys dhor, Boulenger, p. 20.

The name *dhor* has no standing. It was changed to *dentata* by Gray himself in the original publication, the correction appearing in the *errata* at the end of the Synopsis. As first described *dentata* included also *Kachuga lineata*, the juvenile of the former and the adult of the latter being considered identical. No type of *dentata* is mentioned but the juvenile referred to by Gray on p. 21 as having been presented to him by Mr. Bell is in the British Museum of Natural History, and should be regarded as the type specimen.

Cyclemys amboinensis, Boulenger, p. 21.

Genus **Notochelys**

Cyclemys (part), p. 18.

Notochelys, *Gray*, P.Z.S., 1863, p. 177; Siebenrock, Zool. Jahrb., Supp. 10, p. 504 (1909).

Skin of the posterior part of the head covered with small shields; skull with a bony temporal arch; alveolar surface of jaws without median ridge. Plastron united to the carapace by ligament, with a more or less distinct hinge between the hyo- and hypoplastral bones. Six or seven vertebral shields.

Notochelys platynota.

Cyclemys platynota, Boulenger, p. 18.

Genus **Orlitia**

Orlitia borneensis, Boulenger, p. 24.

Genus **Callagur**

Callagur borneoensis.

Emys borneoensis Schleg. and Müll., Vert. Nat. Nederl. Ind. Rept., 1844, p. 30.

Tetraonyx affinis Cantor, Cat. Malay. Rept., 1847, p. 6 (in part).

Batagur affinis, Gunther, Rept. Brit. Ind., 1864, p. 40, pl. 3.

Batagur picta Gray, P.Z.S., 1862, p. 204.

Callagur picta, Boulenger, p. 25.

Cantor described his *Tetraonyx affinis* from three juveniles caught at Penang, all of which are in the collection of the British Museum of Natural History. Two of them are specimens of *Batagur baska*, which was described by Gray in 1830; the remaining one is the species now generally known as *Callagur picta* Gray, but which was not described under that name until 1862.

Genus **Batagur**

Batagur baska, Boulenger, p. 26.

Family **Cheloniidae**

KEY TO THE GENERA

Costal shields 4 pairs.

Dorsal shields juxtaposed; one pair of prefrontal shields; upper jaw not hooked *Chelonia*.

Dorsal shields strongly imbricate; two pairs of prefrontal shields; upper jaw hooked ... ... *Eretmochelys*.

Costal shields, 5 pairs or more ... ... *Caretta*.

Genus **Chelonia**

Chelone (part), p. 27.

Chelonia, Brongniart, Bull. Soc. Philom. Paris II, p. 89.

Chelonia mydas.

Chelone mydas, Boulenger, p. 27.

Chelonia japonica, Stejneger, Herpet. Japan, p. 509 (1907).

Genus **Eretmochelys**

Chelone (part), p. 28.

Eretmochelys, Fitzinger, Syst. Rept., p. 30 (1843).

Eretmochelys imbricata.

Chelone imbricata, Boulenger, p. 28.

Eretmochelys squamosa, Stejneger, Herpet. Japan, p. 511 (1907) and Proc. U. S. Nat. Mus., Vol. 38, p. 114 (1910).

Genus **Caretta**

Thalassochelys, p. 29.

Caretta Rafinesque, Spec. Sc. Palermo, II, p. 66 (1814); Stejneger, Proc. U. S. Nat. Mus., p. 714 (1902); Siebenrock, Zool. Jahrb., Supp. 10, p. 548 (1909).

Caretta caretta.

Thalassochelys caretta, Boulenger, p. 29.

Caretta caretta, Siebenrock, Zool. Jahrb. Supp. 10, p. 549 (1909).

Caretta olivacea, Garman, Bull. U. S. Mus., No. 25, 1884, p. 294; Stejneger, Herpet. Japan, p. 507 (1907) and Proc. U. S. Nat. Mus., Vol. 38, p. 114 (1910).

Family **Dermochelyidae**

Sphargidae, Boulenger, p. 30.

Dermochelyidae, Siebenrock, Zool. Jahrb. Supp. 10, p. 551 (1909).

Genus **Dermochelys**

Dermochelys coriacea.

Dermochelys coriacea, Boulenger, p. 30; Siebenrock, Zool. Jahrb., Supp. 10, p. 553 (1909).

Dermochelys schlegelii, Stejneger, Herpet. Japan, p. 485 (1907).

Order **SQUAMATA**

Sub-order SAURIA

LACERTILIA, p. 31.

Family **Gekkonidae**

A new genus, *Phyllodactylus* is added. *Hemidactylus platyurus* is transferred to the genus *Cosymbotus*, in which genus *Mimetozoon craspedotus* is also placed.

KEY TO THE GENERA

I. Digits not dilated, all clawed.	
Pupil vertical; claw between two scales ...	*Gymnodactylus.*
Pupil round; claw between two scales ...	*Gonatodes.*
Pupil vertical; claw between three scales ...	*Aeluroscalabotes.*
II. Digits dilated at the apex only; furnished inferiorly with two plates separated by a longitudinal groove	*Phyllodactylus.*
III. Digits entirely dilated; the terminal joint compressed and rising from within the extremity of the expansion.	
A. Inner digit clawed.	
Digits free or webbed at the base; no cutaneous expansion along the side of the body ...	*Hemidactylus*
Digits half to fully webbed; a cutaneous expansion along the side of the body	*Cosymbotus.*
B. Inner digit clawless	*Peropus.*
IV. Digits entirely dilated; the terminal joint compressed and rising from the extremity of the expansion.	
Digits free or webbed at the base; sub-digital lamellae paired	*Lepidodactylus.*
Digits free or webbed at the base; sub-digital lamellae single	*Gekko.*
Digits extensively webbed; sub-digital lamellae single; a cutaneous expansion along the side of the body	*Ptychozoon.*

Genus Gymnodactylus

Three species are added; the amended key will read as follows:

I. Lower surface of tail covered with small scales
  Male with preanal and femoral pores, back brown with dark grey spots which may be confluent into cross bars ... ... *marmoratus.*
  Male with preanal pores only; back brown with a double series of from 6 to 8 large rounded spots and smaller ones outside ... *peguensis.*
  Male with preanal pores only; back dark brown with irregular small white spots ... ... *sworderi.*
II. Lower surface of tail with enlarged scales or transverse plates.
  Male with a pubic groove containing pores; femoral pores present; back with dark cross bars ... *pulchellus.*
  Male without pubic groove, with preanal pores only; back with dark cross bars ... ... *consobrinus.*
  Male with 2 or 4 preanal pores, sometimes absent; back with dark longitudinal streaks ... ... *oldhami.*
  Male with preanal and femoral pores; digits webbed at the base; back brown uniform or with small black spots ... ... *brevipalmatus.*

Gymnodactylus marmoratus.

Boulenger, p. 35; Sworder, S'pore. Naturalist, No. 5, 1925, p. 63 (Singapore).

Sworder records a specimen caught in the Botanic Gardens, Singapore.

Gymnodactylus peguensis, Boulenger, p. 36.

Gymnodactylus sworderi.

M. A. Smith, Journ. Malay. Br. Roy. Asiat. Soc., III, 1925, p. 87.

Ear opening oval, oblique, its length equal to one-third the diameter of the eye; rostral large, quadrangular, broader than long; nostril between the rostral, the first supralabial, a supranasal and five small granular scales; 14 upper and 10 lower labials; mental large, sub-triangular, with a pair of large chin-shields in contact with each other behind it.

Head covered above with small granules, largest upon the snout; occiput with small granules and larger rounded tubercles; back covered with small granules and larger rounded, subtrihedral tubercles; a feeble fold along the flank from the axilla to the groin; ventral scales small, imbricate, about 42 across the middle of the belly between the lateral folds; two series of three preanal pores each, slightly diverging from each other, and a series of 10 or 11 enlarged femoral scales, pitted but not perforated, extending outwards from the preanal scales.

Limbs moderate, digits rather short, the plates beneath the basal phalanx roundish, convex, about half the width of the digit; the forelimb pressed backwards extends two-thirds the distance between the axilla and the groin; the hindlimb reaches to the axilla; tail (regenerated) covered with small scales.

Dark brown above, with smallish, irregularly-shaped white spots; these extend along either side of the head leaving the remainder of the upper part of the head uniform in colour; lower parts yellowish-white.

Length of head and body 77; tail (regen.) 58, forelimb 26; hindlimb 35 mm.

Gymnodactylus sworderi is most nearly related to *G. peguensis* Boulenger, from lower Burma and Siam. It differs slightly in the arrangement of the preanal pores and in the number of supralabials and, very markedly, in coloration.

The type and only known specimen was collected 9 miles north of Kota Tinggi, Johore, by Mr. Hope Sworder.

Gymnodactylus pulchellus, Boulenger, p. 36.

Gymnodactylus consobrinus, Boulenger, p. 37.

Gymnodactylus oldhami.

Gymnodactylus oldhami Theobald, Cat. Rept. Brit. Ind., p. 81, 1876; Boulenger, Fauna Brit. Ind., p. 67 (1890); Annandale, Rec. Ind. Mus., p. 320, 1913, pl. XVII, fig. 2; M. A. Smith, Journ. N.H.S. Siam, II, 1916, p. 150 (P. Siam).

Head moderate, oviform, depressed; snout rounded, as long as or a little longer than the distance between the eye and the ear-opening; ear opening suboval one-third the diameter of the eye; forehead concave. Rostral quadrangular, with median cleft above. Nostril bordered by the rostral, an internasal, the first labial and several small scales; 12 or 13 supralabials and 10 or 11 infralabials; mental triangular; first pair of chin-shields large and in contact with one another behind the mental, and succeeded by one or two more pairs widely separated from one another.

Head covered with granules, largest on the snout and interspersed with small rounded tubercules on the occiput; back covered with small granules intermixed with about 20, more or less regular, longitudinal rows of enlarged, rounded subtrihedral tubercles. Throat covered with small granules; belly with cycloid, imbricate scales, about 40 across the middle; an indistinct lateral fold may be present.

Tail cylindrical with whorls of small scales above and larger scales below, those of the median rows being considerably bigger than the others.

Limbs moderate; digits rather short, with enlarged transverse plates inferiorly.

Male with enlarged preanal and femoral scales; preanal pores present or absent, when present in one or two pairs interrupted by an unpierced scale.

Lightish brown above with a dark brown horse-shoe shaped mark on the nape, passing from eye to eye and bordered in front and behind with white; four longitudinal series of whitish spots down the back, usually confluent on the shoulders. Below yellowish-brown; tail alternately banded with light and dark brown.

Length of head and body 67 mm.; tail 70 mm.

Robinson and Kloss obtained this gecko at Tasan (Isthmus of Kra). It has been found also at Maprit, just north of the isthmus and in the district of Tavoy. As pointed out by Annandale (1913) there is no evidence that it occurs in southern India.

Gymnodactylus brevipalmatus.

M. A. Smith, Journ. N.H.S. Siam, VI, p. 48, 1923, plate 5. fig. 1.

Head moderate, depressed, snout a little longer than the orbit; ear-opening small, oval, one-sixth the diameter of the eye. Head above covered with small granules, which are larger over the snout and have small tubercles intermixed with them on the occiput. Rostral quadrangular, broader than high, bordering the nostril anteriorly, and bearing a median ⅄-shaped impression; two enlarged scales above it, also bordering the nostril; 12 or 13 upper labials, the first touching the nostril; 10 or 11 lower labials; mental large, triangular; first pair of chin-shields large and in contact with each other, followed by two pairs of smaller scales; throat covered with small, flat, granular scales. Back with small granules, interspersed with enlarged, rounded, keeled tubercles; a more or less distinct lateral fold of enlarged scales; ventral scales small, cycloid, about 35 to 45 across the belly between the lateral folds.

Tail cylindrical, tapering, covered above with small scales and regularly disposed rows of keeled tubercles, below with irregularly disposed, enlarged flat scales.

Limbs moderate, digits long, the toes webbed at the base; strongly compressed distally, the basal part much broader with 6 or 7 imbricate, transverse plates below.

Brown above, with obscure darker mottlings or small black spots; paler below.

Length. ♂ head and body 64 mm., tail 77 mm.; ♀ head and body 72 mm., tail (incompl.).

Male with 9 preanal pores in a wide angled series and 6 or 7 femoral pores the series separated from one another by an interval; enlarged scales in front and behind the preanal pores; no pubic groove.

Originally collected on Khao Luang (750 metres altitude), Nakon Sritamarat mountains, by Mr. H. M. Pendlebury, the species has since been found in northern Siam and in the Kamchay mountains, southern Cambodia.

Genus **Gonatodes**

I now regard the gecko recorded by me from Peninsular Siam (Journ. N.H.S. Siam, II, 1916, p. 151) under the name of *G. kendalli* as a distinct species, *G. siamensis*. The key to the three forms found in the Malay Peninsula will read as follows:—

I. Base of raised portion of digits with transverse plates beneath; tail with a median series of enlarged scales below—
  A strong canthal ridge; tail with a median row of pointed semi-erect scales below; male without pores; length from snout to vent 80 mm. ... ... *kendalli.*
  Canthal ridge indistinct or absent; tail with a median series of enlarged, pointed, not erect, scales below; male with from 2 to 8 preanal pores, sometimes absent; length from snout to vent 42 mm. ... ... *siamensis.*
II. Base of raised portion of digits with irregular, small scales; tail with small, keeled scales below.
  Male with from 3 to 8 preanal pores ... ... *affinis.*

Gonatodes kendalli.

Gonatodes kendalli, Boulenger, p. 38; M. A. Smith, Journ. Sarawak Mus., III, 1925, p. 23.

Range. Malay Peninsula (Bukit Timah, Singapore); Pulau Tioman; Pulau Siantan, Anambas; Great Natunas; Borneo (State of Sarawak).

Gonatodes siamensis.

Gonatodes siamensis, M. A. Smith, Journ. Sarawak Mus., III, 1925, p. 21.

Gonatodes kendalli, (non Boulenger), M. A. Smith, Journ. N.H.S. Siam, II, 1916, p. 151.

Habit slender. Snout broad and rounded, depressed, longer than the distance between the eye and the ear-opening. Ear-opening vertically oval, not more than half the diameter of the orbit. Rostral large, quadrangular, broader than high with deep median cleft; nostril in contact with the rostral, an internasal and small scales behind; 9 to 11 upper, and 8 to 10 lower, labials; mental large, subtriangular; a pair of chin-shields separated from one another by a scale.

Head covered with granules, smallest on the occiput; no marked canthal ridge; back and sides of body covered with a mixture of small granules and large, keeled tubercles, the tubercles arranged in more or less regular rows; belly covered with small, imbricate scales; throat with small granules. Tail with small scales and whorls of pointed tubercles above and on the sides, below with large, pointed, flat scales, the median series being larger than the others. Male with from 2 to 8 preanal pores, sometimes absent altogether.

Limbs long and slender; digits long and slender, with small lamellae inferiorly and a large rounded plate at the articulation of the basal and proximal phalanx.

Total length 95 mm.; head and body 42 mm.

Brownish-green above, mottled and speckled with lighter and darker shades; below light-brownish.

Type locality Maprit, Patiyu, 60 kilometres north of the Isthmus of Kra. The species has also been met with in the Nakon Sritamarat mountains, and at Puket, Krabi and Tasan in the northern part of the Malay Peninsula. Also in south Tenasserim and in the mountains near Chantabun in S. E. Siam.

Gonatodes affinis.

Gonatodes affinis, Boulenger, p. 38; M. A. Smith, Journ. Sarawak Mus., III, 1925, p. 23.

Gonatodes kendalli, (non Boulenger), M. A. Smith, Journ. F. M. S. Mus., X, 1922, p. 268.

Range. Penang and the Perak Hills; Fraser's Hill, Pahang; Batu Caves, Selangor; Bukit Besar, Patani.

Genus **Aeluroscalabotes**

Aeluroscalabotes felinus.

Boulenger, p. 39; Sworder, S'pore. Nat., No. 5, 1925, p. 64.

I have recently obtained a specimen of this remarkable gecko from Benang Star, Patani. Sworder (1925) records four specimens captured in the Botanic Gardens, Singapore.

After examining the specimens of this lizard in the British Museum, I strongly doubt if *A. dorsalis* Peters, 1872, and *A. longicaudatus* Andersson, 1924, should be regarded as distinct. The characters upon which they are based seem to be varietal, rather than specific.

Genus **Hemidactylus**

Hemidactylus platyurus is placed in the genus *Cosymbotus*.

Hemidactylus frenatus, Boulenger, p. 41.

Hemidactylus brookii, Boulenger, p. 42.

Hemidactylus depressus, Boulenger, p. 43.

Hemidactylus leschenaultii, Boulenger, p. 43.

Hemidactylus flaviviridis, Boulenger, p. 44.

Hemidactylus garnoti, Boulenger, p. 44.

Genus **Peropus**

Gehyra, p. 46.

Peropus, Wiegmann, Nova Acta. Leop. Carol., XVII, 1835, p. 238; Stejneger, Herpet. Japan, p. 180 (1907).

The name *Gehyra*, used by Boulenger for this genus, was instituted by Gray in P.Z.S., 1834, p. 100, and not in Zoological Miscellanies, 1842, as generally stated. The only species mentioned at the time and therefore its genotype was *pacifica*, a gecko now placed under *Hoplodactylus* Fitzinger. *Gehyra* therefore has priority over *Hoplodactylus* which did not appear until 1843; it cannot be used for the species now under consideration.

Peropus mutilatus.

Gehyra mutilata, Boulenger, p. 47.

Peropus butleri.

Gehyra butleri, Boulenger, p. 47.

A specimen was obtained by the F. M. S. Museums on Cameron's Highlands at an altitude of 1,000 metres in 1923.

Peropus larutensis.

Gehyra larutensis Boulenger, p. 48.

A female was obtained by the F. M. S. Museums at 4th Camp (alt. 1,800 metres) in the Cameron's Highlands in 1923; there is also a male specimen in the Raffles Museum from Gunong Kledang, Perak (alt. 800 metres).

Genus **Lepidodactylus**

Lepidodactylus ceylonensis., Boulenger, p. 49.

Lepidodactylus lugubris., Boulenger, p. 49.

Genus **Gekko**

Gecko, p. 50.

The original spelling of Laurenti is preserved.

Gekko gecko.

Gecko verticillatus, Boulenger, p. 50; Sworder, S'pore. Nat., No. 5, 1925, p. 64

Lacerta gecko Linn., Syst. Nat., 1758, p. 250.

Lacerta gecko dates back to Linnaeus, and although the species he referred to is not quite clear it has generally been considered identical with the one named *verticillatus* by Laurenti in 1768. *See* also Andersson in Bihang Svenska Vet-Akad. Band 26, Afd. IV, p. 13 (1900).

Gekko stentor.

Gecko stentor, Boulenger, p. 51.

Patani marks the northern range of this species.

Gekko monarchus.

Gecko monarchus, Boulenger, p. 51.

Genus **Cosymbotus**

Hemidactylus (part), p. 40.
Mimetozoon, p. 45.

Cosymbotus Fitzinger, Syst. Rept., p. 104 (1843).

Digits extensively webbed; sub-digital lamellae in two rows; terminal phalanges compressed and slender, rising from within the extremity of the dilated portion. A cutaneous expansion along the side of the body and tail. Dorsal lepidosis uniform or heterogeneous; pupil vertical; males with preanal and femoral pores.

I can see no grounds for retaining *Mimetozoon* as a distinct genus. It has all the characters of *Cosymbotus*, except that they are in a more highly specialized form.

KEY TO THE SPECIES

Digits half webbed; back with small uniform granules	*platyurus.*
Digits nearly fully webbed, back with small granules and large rounded tubercles ...	*craspedotus.*

Cosymbotus platyurus.

Hemidactylus platyurus, Boulenger, p. 45.

Cosymbotus craspedotus.

Mimetozoon craspedotus, Boulenger, p. 46; Robinson and Kloss, Journ. F. M. S. Mus., V. 1915, p. 153; M. A. Smith, Journ. N.H.S. Siam, II, 1916, p. 152.

Robinson and Kloss found this lizard common on Koh Samui in the Gulf of Siam and I found it common on tree-trunks at the foot of Ronpibun Hill in the Nakon Sritamarat mountains. It has also been obtained at Bangnara, Patani, by Mr. C. J. Aagaard.

Holtzinger-Tenever records the species from Java (Arch. Natg. Berlin, Abt. A. Helt. II, LXXXV, 1920, p. 100). Mr. Sworder obtained one in Perak.

Genus **Ptychozoon**

Ptychozoon kuhli.

Ptychozoon homalocephalum, Boulenger, p. 52.

Ptychozoon kuhli, Stejneger, Proc. Biol. Soc. Washington, XV, p. 37 (1902).

Lacerta homalocephala Creveldt, 1809, is preoccupied by *Lacerta homalocephala* Suckow, 1798 and cannot therefore be used.

Ptychozoon horsfieldii, Boulenger, p. 53.

Genus **Phyllodactylus**

Gray Spicil. Zool., 1830, p. 3; Boulenger, Cat. Liz. Brit. Mus., I. p. 76 (1885).

Digits more or less slender, free, all clawed, with transverse lamellae or tubercles inferiorly, the extremity more or less dilated, with two large plates inferiorly, separated by a longitudinal groove in which the claw is retractile; the distal expansion covered above with scales strongly differentiated from those on the basal portion of the digit. Upper surfaces covered with juxtaposed scales, uniform or intermixed with larger tubercles; abdominal scales generally imbricate. Pupil vertical; males without preanal or femoral pores (except in *P. siamensis*).

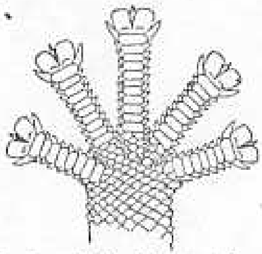

Fig. 2. Hand of *Phyllodactylus siamensis.*

The genus is widely distributed throughout the world; one species only inhabits Asia.

Phyllodactylus siamensis.

Boulenger, P.Z.S., 1898. p. 918, fig.; Annandale Ann. Mag. Nat Hist., (7) XV, 1905, p. 28; M. A. Smith, Journ. N.H.S. Siam, II, 1916, p. 52.

Snout rounded, longer than the distance between the eye and the ear-opening; ear opening vertically oval, half or less than half the diameter of the eye. Rostral quadrangular, broader than high, with median cleft above. Nostril bordered by the rostral, an internasal and several small scales. Seven or eight upper and six or seven lower labials; mental triangular; a pair of large chin-shields in contact with one another behind the mental followed by one or two smaller pairs on the outer side of the first pair.

Snout covered with equal, rather large granules, back of head with minute granules intermixed with larger rounded ones. Back covered with small granules and trihedral strongly keeled tubercles forming 8 to 12 very regular longitudinal series; on the sides the enlarged scales lose their keels and pass gradually into the rather large imbricate, ventral scales of which there are from 20 to 25 across the belly.

Tail covered with imbricate scales, the dorsals keeled; a ventral series of enlarged, lamellar scales.

Limbs moderate, digits rather short, moderately dilated at the end, with narrow, transverse lamellae inferiorly, 10 to 14 under the fourth toe.

Male with 6 or 7 preanal pores in an obtuse-angled series.

From snout to vent 50 mm.; tail 58 mm.

Grey or greyish brown above, uniform or with irregular black spots and blotches. Intergradation between the two colour forms is rare.

I have examined a specimen from Langsuan (Lat. 10° N.) in the Malay Peninsula. Farther north in Siam it is common, being particularly abundant along the railway track, both on the open line and about the timber-stacks in the stations. Its extension into the Malay Peninsula appears to be due to the building of the line from Bangkok to Penang.

Phyllodactylus burmanicus Annandale (Ann. Mag. Nat. Hist., (7) XV, 1905, p. 28, and Journ. Asiat. Soc. Bengal, I, 1905, p. 83), from Tavoy, I regard as identical with *P. siamensis*, the characters upon which it has been separated being insufficient when a large series of *P. siamensis* is examined. Altogether I have examined about 80 specimens of *P. siamensis* from various parts of Siam.

Family **Agamidae**

An agamid under the name of *Salea rosaceum* was desrribed in 1889 by Thominot (Bull. Soc. Philom. Paris, (8) I, p. 24) as having come from Singapore. From the description it was not a *Salea*—a genus at present confined to southern India—and the specimen, originally in the Paris Museum, cannot now be found.

Genus **Draco**

One species *Draco taeniopterus* Gunther, is added to the fauna of the Peninsula.

Draco volans, Boulenger, p. 57.

The species has not been found north of Nakon Sritamarat, Lat. 8° 30′ N. There are specimens in the Raffles Museum obtained on Pulau Tioman.

Draco maculatus.

Boulenger, p. 58; M. A. Smith, Journ. N.H.S. Siam, II, 1916, p. 152; (Nakon Sritamarat); Robinson and Kloss, Journ. F. M. S. Mus., V, 1915, p. 154 (Koh Samui).

Information as to the exact distribution of this species in the Malay Peninsula is still needed. It is the commonest flying-lizard in Siam and has been obtained as far south as Nakon Sritamarat. Cantor (1849) recorded four specimens taken in the hills of Penang, and Boulenger in his Catalogue of Lizards, 1885, records it from Singapore but does not state upon what evidence. In neither of these localities has it been obtained since.

Draco fimbriatus.

Boulenger, p. 59; M. A. Smith, Journ. N.H.S. Siam, II, 1916, p. 152 (Peninsular Siam) and Journ. F. M. S. Mus., X, 1922, p. 268 (Gunong Tahan).

Common at Bangnara, in Patani, and has been found also in the Nakon Sritamarat mountains farther north. A specimen was recently taken (1922) at Wray's camp on Gunong Tahan.

Draco punctatus.

Boulenger, p. 59; M. A. Smith, Journ. N.H.S. Siam, II, 1916, p. 153 (Patani).

A third specimen of this rare *Draco* has been obtained at Bangnara in Patani.

Draco cyanolaemus.

Boulenger, p. 60; Robinson and Kloss, Journ. F. M. S. Mus., V, 1915, p. 154 (Bandon).

Robinson and Kloss record two specimens obtained in the Nakon Sritamarat mountains. It has also been found on the Adang Islands, north of Penang.

Draco blanfordi.

Boulenger, p. 61; M. A. Smith, Journ. N.H.S. Siam, II, 1916, p. 153 (Peninsular Siam).

Adult males have a low but distinct caudal crest. In some individuals blackish transverse bands upon the wing-membranes are more or less evident.

Robinson and Kloss in 1919 obtained it on the islands of Pipidon and Puket; also at Nong Kok and Krabi on the west coast of Peninsular Siam, and at Tapli and Tasan in the Pakchan estuary. The range of the species extends over the whole of Siam.

Draco formosus.

Boulenger, p 61; M. A. Smith, Journ. N.H.S. Siam, II, 1916, p. 152 (Peninsular Siam).

The species has been recorded from Patani, the Nakon Sritamarat mountains and from Maprit, Patiyu, just north of the Isthmus of Kra.

The throat of the female is coloured red like that of the male, not green as generally stated.

Draco taeniopterus.

Draco taeniopterus Günther, P.Z.S., 1861, p. 187 and Rept. Brit. Ind., 1864, p. 126, pl. 13, fig. E; Boulenger, Fauna Brit. Ind., p. 113 (1890).

Description. Head small; snout about as long as the diameter of the orbit; nostrils directed upwards, perfectly vertical; tympanum naked, smaller than the eye-opening. Upper head-scales unequal, strongly keeled; 7 to 9 upper labials. Gular appendage of the male slightly longer than the head, covered with very large scales; in the female it is represented by a small tag.

Dorsal scales equal, feebly keeled, not larger than the ventrals, a lateral series of enlarged, distant scales along either side of the body. The fore-limb stretched forward extends well beyond the snout; the hind-limb reaches the axilla or just beyond.

Greyish or brownish above, with metallic gloss; wing membranes above with five arched transverse black bands, about as wide as the interspaces between them; some of these bands may be forked at the base and enclose large light spots; wing membranes uniform below. In living specimens the throat is of a pale greenish colour and the insides of the wattles vary from pale to deep red. The posterior margin of the wing may have a broad band of maroon.

Length of head and body 75; tail 150 mm.

Distinguished from *D. formosus* by the longer hind-limb (not always reliable), shorter body, smaller size and more brilliant colouring, the bars upon the wing-membranes being broader and jet-black in colour.

Many examples of this lizard were obtained by Robinson and Kloss in their expedition up the west coast of Peninsular Siam in 1919. Specimens were obtained at Tung Pran, Koh Rah, Nong Kok, Delisle Is. and Koh Boi; also at Victoria Point, Mamoh and Tapli in the Pak Chan estuary. I have also seen examples from the hills near Bandon. The species extends north into Central and South-eastern Siam.

Draco microlepis.

Boulenger, p. 62; Robinson and Kloss, Journ. F. M. S. Mus., V, 1915, p. 154 (Koh Pennan).

Draco melanopogon.

Boulenger, p. 62; Robinson and Kloss, Journ. F. M. S. Mus., V, 1915, p. 154 (Bandon); M. A. Smith, Journ. N.H.S. Siam, II, 1916, p. 154, (Nakon Sritamarat) and Journ. F. M. S. Mus., X, 1922, p. 268 (Kuala Tahan); Sworder, S'pore. Nat., No. 5, 1925, p. 66 (Singapore).

In addition to the above records it has been obtained by Robinson and Kloss at Krabi and Tasan in Peninsular Siam and by Mr. Norman Smedley, on Pulau Tioman.

Draco quinquefasciatus.

Boulenger, p. 63; M. A. Smith, Journ. N.H.S. Siam, II, 1916, p. 154 (Patani).

Draco maximus, Boulenger, p. 63.

Genus **Aphaniotis**

De Rooij has pointed out that a gular sac is indicated. Specimens in the Raffles Museum have a distinct gular sac, though not comparable with that in other genera (*e.g. Draco*).

Aphaniotis fusca.

Aphaniotis fusca, Boulenger, p. 64; Sworder, Journ. Malay. Br. R. Asiat. Soc. VII, 1929, p. 327 and text figures.

Aphaniotis floweri Werner, Zool. Jahrb., Syst., XIII, 1900, p. 486.

Two specimens recently obtained by my native collector in Patani mark the northern range of this species.

Three specimens were collected on Pulau Tioman.

Genus **Gonocephalus**

Gonyocephalus, p. 65.

The original spelling is preserved. Two species are added, and the amended key will read as follows:—

Supraciliary border normally raised.......................................
..................................*borneensis, harveyi, grandis, robinsoni.*
Supraciliary border strongly raised.
  Dorsal crest almost as high as nuchal ... *doriae.*
  Dorsal crest much lower than nuchal ... *chamaeleontinus*

Gonocephalus grandis.

Gonyocephalus grandis, Boulenger, p. 66.

A male, a female and three juveniles were obtained by my collector near Setun, Lat. 6° 40″ N. Two specimens were recently obtained on Pulau Tioman.

Gonocephalus robinsoni.

Gonyocephalus robinsonii, Boulenger, p. 67; M. A. Smith, Journ. F. M. S. Mus., X, 1922, p. 269.

I have examined a specimen from the Cameron Highlands, Pahang (alt. 4,800 feet) and two more from Lipis district (alt. 3,500 feet). All have a few enlarged and differentiated scales upon the flanks. The number of scales round the body varies from 70 to 90.

Gonocephalus borneensis.

Gonyocephalus borneensis, Boulenger, p. 65; Sworder, S'pore. Nat. No. 5, 1925, p. 66.

Sworder records a juvenile collected on Singapore Island. The locality is almost certainly incorrect.

Gonocephalus harveyi.

Gonyocephalus harveyi, Boulenger, p. 66.

The species has been recently obtained on Pulau Tioman.

Gonocephalus doriae

Gonyocephalus doriae Peters, Mon. Berlin Ac., 1871, p. 570; De Rooij, Rept. Indo-Austral. Archipel., I, 1915, p. 100.

Snout equal to or slightly longer than the diameter of the orbit; canthus rostralis strongly projecting; supraciliary border strongly raised, forming an angle at its posterior part; tympanum distinct, smaller than the eye-opening. Head-scales moderate in size, smooth; no enlarged scales on the temple; 11 or 12 upper and the same number of lower labials. Gular sac well-developed, with serrated anterior border, covered with smooth scales. Body strongly compressed; nuchal and dorsal crests continuous, almost equal, beginning between the posterior border of the orbits, its height not quite equal to the diameter of the orbit, composed of triangular scales, covered at the base with large quadrangular ones. Dorsal scales small, equal, smooth, slightly imbricate; ventral scales much larger, smooth. Tail strongly compressed, with serrated edge above and covered with large smooth scales, the two lowermost rows of which are strongly keeled. Limbs slender; the hind-limb reaches the orbit; third and fourth fingers equal.

Olive-brown or greenish above, with dark spots on each side of the back; tail with dark annuli. Juveniles have dark spots round the eye and on the lips, and a dark gular fold.

Length of head and body 135; tail 200 mm.

Two immature examples obtained by my native collector at Benang Star, Patani, I refer to this species. They differ from the typical form in having a series of three or four enlarged and differentiated, slightly keeled scales, on either side of the back. *G. doriae* is otherwise known only from Borneo.

G. abbotti Cochran, Proc. U. S. Nat. Mus., vol. 60, 1922, p. 1, described from a female example obtained at Trang, is probably referable to this species.

Gonocephalus chamaeleontinus.

Iguana chamaeleontina Laurenti, Syn. Rept., 1768, p. 47.

Gonyocephalus chamaeleontinus, Boulenger, Cat. Liz., 1887, I, p. 285; De Rooij, Rept. Indo-Austral. Archipel., 1915, I, p. 102.

Snout as long as the diameter of the orbit, with rounded elevation in the female; canthus rostralis projecting; supraciliary border strongly raised, angular posteriorly; tympanum distinct about half the diameter of the eye-opening. Head-scales moderate in size, unequal, smooth: a few enlarged tubercles above the ear; ten to twelve upper and twelve to fourteen lower labials. Gular sac large, with serrated anterior border, covered with smooth scales moderate in size. Body strongly compressed; nuchal and dorsal crests continuous, beginning on a line with the posterior border of the orbit, the former very high, its height equalling the length of the snout; it is composed of long compressed scales, with three rows of smaller ones at the base; dorsal crest much lower, reduced to ridge posteriorly. Dorsal scales moderately small, smooth, with enlarged ones here and there; ventral scales much larger, smooth. Tail strongly compressed, one and a half to one and three quarters times as long as the head and body, with serrated upper edge; covered above with large, smooth or feebly keeled scales, below with larger strongly keeled ones. Limbs long and slender; the hind-limb reaches the posterior border of the orbit; scales of limbs unequal, smooth or feebly keeled; third finger a little shorter than fourth.

Olivaceous above, with dark reticulations and transverse bands; dark lines radiating from the eye; tail with light and dark annuli; below brownish.

Head and body 156, tail 256 mm.

Previously recorded from the Mentawi Islands, Sumatra, Java and the Natunas. A specimen has been recently obtained on Pulau Tioman by Mr. N. Smedley of the Raffles Museum.

Genus **Acanthosaura**

Acanthosaura armata.

Acanthosaura armata, Boulenger, p. 68; M. A. Smith, Journ. N.H.S. Siam. II, 1916, p. 53 (*crucigera=armata*).

Acanthosaura crucigera, Boulenger, p. 69;

Specimens of this lizard were obtained by Mr. Norman Smedley on Pulau Tioman.

Acanthosaura horrescens Andersson, Kungl. Sven. Vetakad. Hand, Band 55, 1916, p. 55, I believe to be a northern race of *A. armata*, differing from it in having a more or less developed gular pouch. Examination of material from all parts of Siam shews that a feebly developed pouch is present in examples from the region of the Isthmus of Kra, and that its maximum development is attained in specimens from northern Siam and Cambodia. It is present in both sexes but is larger in the males than in the females. Juveniles have no pouch.

Genus **Calotes**[*]

One species is added. The eggs of *C. versicolor* and *C. microlepis* are oval-shaped.

Key to the Species

I. No fold in front of the shoulder.
    A. Lateral scales pointing downwards and backwards;
        Dorsal scales larger than the ventrals; 50—57 round the body; gular pouch not developed ... ... *floweri.*

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[*] I take this opportunity to record that *Calotes aberrans* Rosen, Ann. Mag. Nat. Hist., (7) XVI, 1905, p. 133, pl. 8, is in my opinion a specimen of *Cophotis sumatrana* Hubrecht. De Rooy in her Reptiles of the Indo-Australian Archipelago, I, 1915, omits to mention the name. Through the kindness of Dr. H. Wallengren of the Zoological Institute of Lund I have been able to examine Rosen's type, collected in Tjibodas, Java. It is a female with three well developed eggs, and has all the characters of *Cophotis* Peters. The tympanic area is covered by a single large keeled scale and the tail, though now much shrivelled, was evidently prehensile. The dorsal crest is just indicated. Except that it has no rostral appendage it agrees entirely with Hubrecht's description drawn up from a single male specimen obtained in Sumatra.

        Dorsal scales larger than the ventrals; 39 round the body; gular pouch well developed ... ... *flavigula.*
        Dorsal scales smaller than the ventrals; 50—100 round the body ... ... *cristatellus.*
    B. Lateral scales pointing backwards and upwards; 35—50 round the body ... ... *versicolor.*
II. An oblique curved fold in front of the shoulder ... ... *emma.*

Calotes floweri.

Boulenger, p. 70; M. A. Smith, Journ. F. M. S. Mus., X, 1922, p. 269.

A specimen was obtained on Gunong Gedang, Pahang, alt. 6,400 feet, in 1922. The range of the species extends into Cambodia.

Calotes cristatellus.

Boulenger, p. 70; M. A. Smith, Journ. F. M. S. Mus., X, 1922, p. 269.

This lizard is rare north of Lat. 7° N., but a specimen has been taken on the Langbian plateau (S. Annam).

As pointed out by me in 1922, Boulenger's statement that the number of scale-rows round the body varies from 57 to 120 appears to be a slip. I have never seen a specimen with more than 100.

Calotes flavigula.

M. A. Smith, Journ. F. M. S. Mus., XI, 1924, p. 183.

Head elongate, the snout longer than the width of the orbit. Upper head-scales fairly large, unequal in size, feebly keeled on the supraorbital region; tympanum half the diameter of the orbit; gular pouch well developed, covered with smooth scales, those along the edge being very small; six upper and six lower labials. Nuchal crest formed of six small spines; dorsal crest a mere ridge. Thirty-nine scales round the middle of the body, all the dorsals, except the uppermost row, directed backwards and downwards, feebly keeled; laterals larger, smooth; ventrals smallest, strongly keeled.

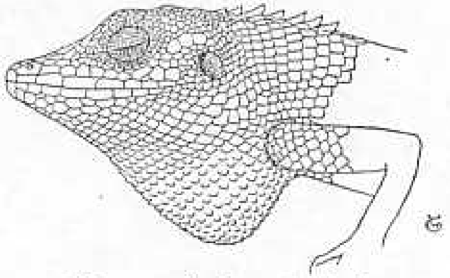

Fig. 3. *Calotes flavigula.*

The hind-limb reaches the axilla, the fore-limb to beyond the tip of the snout; third and fourth fingers equal; third toe a little shorter than the fourth. Tail moderately long, compressed.

Dark-brown on the back, greyer on the head; lips white with dark vertical streaks; large white spots on the shoulders and flanks; gular pouch bright yellow in life.

From snout to vent 68 mm., tail 127 mm.

Allied to *C. floweri* Boulenger, but differing in the larger body-scales, fewer supralabials, well developed gular pouch and coloration.

Still known only from the type (♂) specimen collected in the Cameron's Highlands.

Calotes versicolor, Boulenger, p. 71.

Calotes emma, Boulenger, p. 72.

Specimens have been obtained on Pulau Rumpia.

Genus **Liolepis**

Liolepis belliana, Boulenger, p. 73.

K. P. Schmidt has recently (Bull. Amer. Mus. Nat. Hist. LIV, 1927, p. 416) referred to this species under the name of *Liolepis belli*, perhaps on the understanding that the first reference to this species is by Gray in Zool. Journ., III, 1827, p. 216, as mentioned by Sherborn in his Index Animalium. This is unfortunately an error: *belli* does not occur on p. 216 of the Zool. Journ., and Mr. Sherborn tells me he cannot explain how the slip arose. The first mention of this species is under the name of *belliana* on p. 220 of the Journal, as stated by Boulenger.

Family **Varanidae**

Genus **Varanus**

Varanus flavescens, Boulenger, p. 76.

Varanus nebulosus, Boulenger, p. 77.

Varanus dumerilii, Boulenger, p. 77.

Varanus rudicollis, Boulenger, p. 78.

Varanus salvator, Boulenger, p. 78.

Family **Lacertidae**

Genus **Takydromus**

Tachydromus; p. 79.

The original spelling is preserved.

Takydromus sexlineatus.

Tachydromus sexlineatus, Boulenger, p. 79.

The sexes in adult life can be easily distinguished, the male being more brightly coloured than the female. The light dorsolateral band, with its black edging, is inconspicuous or almost absent in the female and the general colour is paler. Young ones resemble the female in coloration.

Family **Scincidae**

The genus *Tropidophorus* is added, one of its members having been discovered in the extreme north of the Peninsula.

The introduction of the Australian scink, *Egernia depressa*, Gunth., into Singapore has been chronicled by Mr. F. N. Chasen (Journ. Malay. Br. Royal Asiat. Soc., III, 1925, p. 100); whether it will establish itself as a permanent inhabitant of this region remains to be seen.

KEY TO THE GENERA

I. Tympanum exposed and superficial ... *Tropidophorus*.

II. Tympanum if distinct, more or less deeply sunk.

Pterygoid bones separated in the middle of the palate, the palatal notch extending anteriorly to a line connecting the centres of the eyes ... ... *Mabuya*.

Pterygoid bones in contact in front, the palatal notch not extending to between the centres of the eyes ... *Lygosoma*.

Genus **Tropidophorus**

Palatine and pterygoid bones in contact on the middle line of the palate which is toothless. Teeth conical. Eyelids well developed, scaly. Tympanum exposed, superficial. Nostril pierced in a single nasal; no supranasals; prefrontals well developed; interparietal distinct. Limbs well developed, pentadactyle; digits cylindrical, with transverse lamellae inferiorly.

Range. The Indo-Chinese Peninsula and Malay Archipelago, Queensland.

Tropidophorus robinsoni.

M. A. Smith, Journ. N.H.S. Siam, III, 1919, p. 223.

Upper head-shields feebly striated; a single frontonasal, nearly as broad as long; prefrontals in suture; frontal as long as, or a little longer than, the frontoparietal and interparietal together; parietals in suture behind the interparietal; four supraoculars, the first longest; six supraciliaries anterior to the fourth supraocular, which enters the supraciliary border; nostril pierced in a single nasal; a single anterior loreal, succeeded by another of about the same size; six supralabials, the fourth largest and subocular; temporals small and scale-like except one in contact with the parietal which is usually much larger; a single post-mental; tympanum nearly as large as the eye-opening; 30 or 32 scales round the middle of the body, dorsals strongly keeled, not mucronate; nuchals tri- or multicarinate; laterals keeled, a little smaller than the dorsals and directed straight backwards; gular scales smooth or feebly keeled; ventrals smooth; a pair of large preanals; caudal scales keeled, except the median series below; the hind-limb reaches the wrist or not quite so far; 17 or 18 subdigital lamellae beneath the fourth toe.

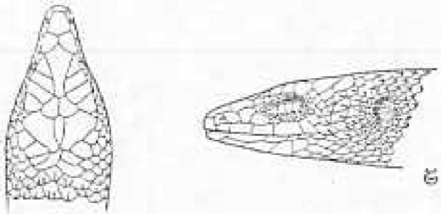

Fig. 4. *Tropidophorus robinsoni.*

Brownish or blackish above, with light brown, black-edged cross bars or alternating spots, the first on the nape; sides of body and tail with small white spots; below yellowish-white, the belly uniform, the throat and tail more or less thickly spotted with black; head blackish, labials with white spots.

Length of head and body 75 mm.; tail 95 mm.

Type locality Tasan, West of Chumporn, where it is common. I have also examined specimens in the Indian Museum from Tavoy.

Genus **Mabuya**

Mabuia, p. 82.

The original spelling is preserved. In this genus *M. siamensis* becomes *M. longicaudata*. *Lygosoma praesigne* Boulenger, is removed from *Lygosoma* and placed under *Mabuya*.

Mabuya novemcarinata, Boulenger, p. 82.

Mabuya macularia.

Mabuia macularia, Boulenger, p. 83.

There are three examples in the Raffles Museum from Tebing Tinggi, Kelantan. I have also obtained specimens from Bangnara, Patani and from the Nakon Sritamarat mountains.

Mabuya multifasciata.

Mabuia multifasciata, Boulenger, p. 84; Sworder, S'pore. Nat. No. 5, p. 67 (Singapore).

Mabuya rugifera.

Mabuia rugifera, Boulenger, p. 83; Sworder, S'pore. Nat. No. 5, 1925, p. 67 (Singapore).

I have seen a specimen from Benang Star, Patani.

Mabuya longicaudata.

Euprepis longicaudata Hallowell, Trans. Amer. Philos. Soc., XI, 1856. p. 77. pl. IV.

Mabuia siamensis, Boulenger, p. 84.

Mabuya longicaudata, Stejneger, Herpet. Japan, p. 214 (1907).

As shewn by Stejneger, Hallowell's *Euprepis longicaudata* and Gunther's *Eumeces siamensis* are identical and the earlier name must therefore be used.

The species has been met with on Pulau Tioman.

Mabuya praesigne.

Lygosoma praesigne, Boulenger, p. 88.

Mabuia praesigne, M. A. Smith, Journ. N.H.S. Siam, II, 1916, pp. 55 and 156.

This lizard has been found in the Nakon Sritamarat mountains; it is probably not as common in the Peninsula as it is recorded to be. Examples with only 26 scales round the body have been met with. The species can be distinguished from the other members of the genus in having no supranasal shields.

Genus **Lygosoma**

Seven species are added, and one, *L. singaporense* removed. The amended key will read as follows:—

I. Limbs well developed, pentadactyle, ear opening distinct.

A. Lower eyelid scaly; no supranasals.

1. The adpressed limbs overlap.

24 scales round the body ... ... *stellatum.*

30 to 42 scales round the body.

a. Four supraoculars; the hind limb does not reach the axilla.

36 to 38 scales round the body; a dark band along the upper part of the flank ... ... *indicum.*

34 to 36 scales round the body; no dark band; back with black spots arranged in series ... *tersum.*

b. Four supraoculars; the hind-limb reaches nearly to the eye ... *anomalopus.*

c. Five supraoculars.

30 to 32 scales round the body; no nuchals ... *scotophilum.*

32 to 34 scales round the body; a light vertebral line present ... ... *sanctum.*

38 to 42 scales round the body; nuchals present ... *maculatum.*

2. The adpressed limbs just touch or fail to meet.

Fourth toe not or scarcely longer than third; ear very distinct; 30 to 32 scales round the body. *butleri.*

Fourth toe distinctly longer than third; ear very distinct. 32 scales round the body ... *malayanum.*

Fourth toe distinctly longer than third; ear small; 38 scales round the body ... ... *cameronicum.*

B. Lower eyelid scaly; supranasals present.

1. The adpressed limbs overlap. 28 to 30 scales round the body, dorsals with 5 to 9 keels ... *olivaceum.*

2. The adpressed limbs do not meet; 26 to 30 scales round the body.

a. Subocular shield very long, at least twice as long as the shield preceding it.

Dorsal scales smooth or indistinctly tricarinate ... *bowringii.*

Dorsal scales quinquecarinate ... ... *herberti.*

b. Subocular shield not twice as long as the shield preceding it.

26 to 28 smooth scales round the body ... *albopunctatum.*

30 scales round the body, dorsals tricarinate ... *opisthorhodum.*

38 to 40 scales round the body ... ... *bampfyldii.*

C. Lower eyelid with an undivided transparent disc.

Frontoparietal single; supranasals present ... *atrocostatum.*

Frontoparietal double; supranasals absent.

28 to 30 scales round the body, vertebrals enlarged ... ... *vittigerum.*

34 to 38 scales round the body, vertebrals not enlarged ... ... *melanostictum.*

II. Limbs well developed, pentadactyle; ear covered with scales.

Frontoparietal single; 18 or 20 scales round the body; back with black longitudinal lines ... ... *quadrivittatum.*

Frontoparietal single; 20 scales round the body; back uniform ... ... *surdum.*

Frontoparietal double; 22 scales round the body ... ... *cophias.*

III. Limbs rudimentary.

Digits five, a punctiform ear opening; 24 to 26 scales round the body ... ... *quadrupes.*

Digits two; ear hidden; 26 scales round the body ... ... *larutense.*

Digits two to the fore-limb; hind-limb undivided; 22 scales round the body ... *miodactylum.*

Lygosoma stellatum.

Lygosoma stellatum, Boulenger, p. 87; M. A. Smith, P.Z.S., 1921, p. 431.

The range of the species extends to southern Annam.

Lygosoma indicum.

Hinulia indica, Gray, Ann. Mag. Nat. Hist., (2) XII, 1853, p. 388.

Lygosoma indicum, Boulenger, Fauna Brit. Ind., p. 195 (1890); and Fauna Malay Pen., p. 87, fig. 24, M. A. Smith, Journ. F. M. S. Mus., X, 1922, p. 270.

Distance between the end of the snout and the fore-limb $1\frac{1}{3}$ to $1\frac{1}{2}$ times in distance between the axilla and groin. Snout obtusely pointed; lower eyelid scaly; no supranasals; rostral convex, in good contact with the frontonasal; frontonasal broader than long, in narrow contact with the frontal; frontal as long as the frontoparietals and interparietal together, in contact with two (sometimes three) supraoculars; four large supraoculars, the second the largest; parietals in suture behind the interparietal; no nuchals; seven supralabials the fifth and sixth below the eye. Ear-opening oval, scarcely smaller than the eye-opening; no auricular lobules. 34 to 38 smooth scales round the middle of the body, the laterals smallest; a pair of large preanals.

Limbs well developed, pentadactyle; the hind-limb reaches the elbow of the adpressed fore-limb or not quite so far. Digits rather elongate, compressed; 17 to 20 sub-digital lamellae under the fourth toe. Tail $1\frac{1}{2}$ to 2 times as long as the head and body.

Light or dark brown above, uniform or with scattered darker dots; a dark band along the side of the head and upper half of the body, light-margined above, often spotted with white; lower surface whitish.

From snout to vent 85 mm.; tail 160 mm.

Range. From the Eastern Himalayas to Annam and the Malay Peninsula. Two specimens were obtained in 1922 on Fraser's Hill.

Lygosoma tersum.

M. A. Smith, Journ. N.H.S. Siam, II, 1916, p. 44, fig.

Distance between the end of the snout and the fore-limb 1¼ times in distance between the axilla and groin. Lower eyelid scaly. Snout obtusely pointed; rostral convex, in contact with the frontonasal; no supranasals; prefrontals forming a suture; frontal as long as the frontoparietals and interparietal together, in contact with the first two supraoculars; four large supraoculars, the second the largest; parietals in suture behind the interparietal; no nuchals. Seven supralabials, the fifth and sixth below the eye. Ear-opening oval, smaller than the eye-opening; no auricular lobules. 34 to 36 smooth scales round the middle of the body, the laterals smallest. A pair of large preanals.

Limbs well developed, pentadactyle; the hind-limb reaches the elbow of the adpressed fore-limb. Digits rather elongate, compressed; 18 to 20 subdigital lamellae beneath the fourth toe.

Dark brown above, with more or less distinct black spots which are arranged in longitudinal series. Sides of body paler, with or without similar markings; below white; lips with dark bars.

From snout to vent 90; tail 170 mm.

The species was first obtained on Khao Wang Hip, in the Nakon Sritamarat mountains. It has since been obtained at Tasan, in the Pak Chan estuary (Isthmus of Kra).

Lygosoma anomalopus, Boulenger, p. 90.

Lygosoma scotophilum, Boulenger, p. 88.

The species has been met with on Pulau Tioman. Its range also extends to Sumatra (Boulenger, Journ. F. M. S. Mus., VIII, 1920, p. 289).

Lygosoma sanctum, Boulenger, p. 89.

Lygosoma maculatum, Boulenger, p. 89.

Lygosoma butleri.

Boulenger, p. 91; M. A. Smith, Journ. F. M. S. Mus., X, 1922, p. 270.

A specimen obtained by the F. M. S. Museums in 1922 on Fraser's Hill differs from the description of the types in the following particulars:—

Distance between the end of the snout and the fore-limb 1⅓ times in distance between the axilla and groin; 10 and 11 sub-digital lamellae beneath the fourth toe.

Brown above and on the sides, thickly spotted with yellow; no dark lateral band; below yellowish.

Lygosoma malayanum, Boulenger, p. 91.

Lygosoma cameronicum.

Sphenomorphus cameronicus, M. A. Smith, Journ. F. M. S. Mus., X, 1924, p. 184, fig.

Body elongate, the distance between the end of the snout and the fore-limb 1⅔ times in distance between the axilla and groin. Snout rounded; lower eyelid scaly; no supranasals; ear opening moderate, about half the size of the eye-opening; no auricular lobules. Rostral convex, in broad contact with the frontonasal; frontonasal twice as broad as long, in contact with the frontal; frontal as long as the frontoparietals and interparietal together, in contact with the first two supraoculars; four large supraoculars, the second the largest; frontoparietal twice as large as the interparietal; parietals in contact behind the interparietal; no nuchals; two loreal shields one behind the other; seven supralabials, the fifth and sixth below the eye.

Thirty-eight smooth scales round the middle of the body, subequal; a pair of enlarged preanals.

Limbs well developed, but short, just meeting when adpressed; fourth toe much longer than third, with 20 to 22 lamellae beneath it. Tail thick, long, more than twice the length of the head and body.

Dark-brown above, spotted with black; a black band along the upper half of the body extending on to the tail, spotted with white; below white.

From snout to vent 65 mm.; tail 140 mm.

Still known only from the type specimen obtained in Cameron's Highlands (Lipis district).

Lygosoma olivaceum.

Boulenger, p. 91; M. A. Smith, Journ. N.H.S. Siam, II, 1916, p. 156 (Patani); and Journ. F. M. S. Mus., X. 1922, p. 270 (Kuala Tahan).

The range of this scink extends into Siam and Cambodia. Mr. Norman Smedley obtained specimens on Pulau Tioman.

Lygosoma bowringii.

Boulenger, p. 92; M. A. Smith, Journ. N.H.S. Siam, II, 1916, p. 156 (Patani); Sworder, S'pore. Nat. No. 5, pp. 68 and 101 (Singapore and Negri Sembilan).

This scink has been obtained at Bangnara, Patani, also at Port Dickson and on Singapore Island.

Lygosoma herberti.

M. A. Smith, Journ. N.H.S. Siam, II, 1916, p. 45.

Distance between the end of the snout and the fore-limb 1⅘ to 2 times in distance between the axilla and groin. Snout obtuse; lower eyelid scaly; supranasals present, in contact behind the rostral; rostral convex, frontonasal broader than long, in good contact with the frontal; frontal as long as the interparietals and parietal together, in contact with two supraoculars; four large supraoculars, the second the largest; parietals in suture behind the interparietal; seven supralabials, the fifth below the eye and very long, nearly as long as the three preceding it together. Ear-opening, small, rounded, with small auricular lobules. Twenty-eight scales round the middle of the body, subequal, the dorsals with five keels. Preanals feebly enlarged.

Limbs short, pentadactyle; the adpressed limbs are widely separated. Digits moderately long, compressed, the fourth toe a little longer than the third with 14 sub-digital lamellae. Tail not much longer than the head and body.

Bronze-brown above, paler below. A more or less distinct dark lateral band along the side of the head and body, usually with lighter spots.

From snout to vent 67 mm.; tail 75 mm.

Originally discovered at the foot of Khao Wang Hip in the Nakon Sritamarat mountains, it has since been obtained at Klong Tun Sai on the island of Puket and at Tung Pran, Takua Pa.

Lygosoma albopunctatum, Boulenger, p. 93.

Lygosoma opisthorhodum.

Lygosoma (*Riopa*) *ophisthorhodum* Werner, Mitt. Naturh. Mus. Hamburg, 1910, XXVII, p. 45.

Lygosoma opisthorhodum, De Rooij, Rept. Indo-Austral. Archipel. 1915, I, p. 265.

A single immature example of this scink was taken on Maxwell's Hill, Perak, at 3,600 feet and is now in Raffles Museum. It agrees entirely with Werner's description. Length of head and body 30; tail 38 mm. The species is otherwise known only from the type locality in sumatra. [For description see p. 134, post.].

Lygosoma bampfyldii, Boulenger, p. 93.

Lygosoma vittigerum.

Boulenger, p. 94; M. A. Smith, Journ. N.H.S. Siam, II, 1916, p. 156 (Patani) and Journ. F. M. S. Mus., X, 1922, p. 270 (Kuala Teku).

A tree-loving lizard and probably more common in the Peninsula than is recorded. Specimens have been obtained at Kuala Teku (Pahang), Jor (Perak), Bangnara (Patani) and Tasan (Isthmus of Kra). The examples from K. Teku have 30 scales round the body.

The range of the species extends into north Siam and French Indo-China. There is a specimen from Sandakan, Borneo, in the British Museum, and from Pulau Tioman in the Raffles Museum.

Lygosoma atrocostatum.

Lygosoma atrocostatum, Boulenger, p. 94.

Lygosoma singaporense, Boulenger. p. 95; Sworder. S'pore. Nat. No. 3, 1924 p. 16 and No. 5, 1925. p. 68.

Sworder has given a very full account of this beach-loving lizard in the "Singapore Naturalist", both as regards its scale-characters and habits. His series fully justifies Annandale's contention that *singaporense* and *atrocostatum* should be united.

The number of scales round the body in specimens from the Malay Peninsula and immediate vicinity varies from 34 to 40. The number of supraocular shields also varies. Sworder (No. 3) records several specimens with five on one or both sides, and one with five has been obtained recently at Port Dickson. The type of *Mabouya jerdoniana* from Pulau Tikus is described as having seven, but a topotype obtained by Flower has only five. The type of *Lygosoma singaporense* is described as having four and five shields respectively.

Lygosoma melanostictum.

Boulenger. Ann Mus. Genova, (2) V, 1887, p. 479. pl. vii, fig. 2; M. A. Smith, Journ. N.H.S. Siam, II, p. 50, 1916 (Nakon Sri-Tamarat).

Habit lacertiform; distance between the end of the snout and the fore-limb $1\frac{1}{3}$ to $1\frac{3}{5}$ times in distance between the axilla and groin. Snout short, obtuse. Lower eyelid with an undivided transparent disk. Nostril pierced in the nasal; no supranasals; fronto-nasal much broader than long, forming a broad suture with the rostral; prefrontals separated or forming a median suture; frontal about as long as the frontoparietals and interparietal together, in contact with the two anterior supraoculars; 4 supraoculars, first longer than second; 9 or 10 supraciliaries; parietals in suture behind the interparietal; no enlarged nuchals; fifth and sixth supralabials below the centre of the eye. Ear-opening oval, a little smaller than the eye-opening; no auricular lobules. Thirty-four to thirty-eight smooth scales round the middle of the body, laterals smallest. A pair of slightly enlarged preanals. The adpressed limbs hardly meet, or slightly overlap. Digits subcylindrical; subdigital lamellae smooth, 16 to 20 under the fourth toe. Tail $1\frac{1}{2}$ to $1\frac{3}{4}$ times the length of head and body.

Pale brown or bronzy above, with black dots which are crowded to form a lateral band from the snout to the tail; a vertebral accumulation of dots sometimes also present; lips and flanks whitish or pinkish, dotted with black; lower surface whitish, throat often dotted with black.

From snout to vent 65 mm.; tail 110 mm.

Range. Burma, Siam, Annam and the Nakon Sritamarat Mountains in the Malay Peninsula.

Lygosoma quadrivittatum, Boulenger, p. 95.

Lygosoma surdum, Boulenger, p. 96.

Lygosoma cophias.

Boulenger, p. 96; M. A. Smith, Journ. F. M. S. Mus., X, 1922, p. 270 (Wray's Camp).

A second specimen obtained at Wray's Camp on Gunong Tahan, differs from the type in the following particulars:—

Distance between the end of the snout and fore-limb $1\frac{1}{3}$ times in distance between the axilla and groin. A pair of enlarged preanals; 10 lamellae beneath the fourth toe.

From snout to vent 35 mm.; tail 50 mm.

Lygosoma quadrupes.

Anguis quadrupes, Linn., 1766, p. 390.
Lygosoma chalcides, Boulenger, p. 97.

Lygosoma larutense.

Boulenger, p. 97; M. A. Smith, Journ. F. M. S. Mus., X, 1922, p. 271 (Gunong Tahan).

A specimen obtained at Padang, Gunong Tahan has 28 scales round the body. In colour it is dark grey on the back and sides, yellowish-white below. The neck has three narrow, transverse, yellow bars, the back, six fine, longitudinal lines.

Lygosoma miodactylum, Boulenger, p. 98.

A legless scink, *Lygosoma anguinoides*, described by Boulenger in Journ. N.H.S. Siam, I, 1914, p. 67, has been found at Maprit and Klong Bang Lai just north of the Isthmus of Kra and may occur in the northern part of the Peninsula. In my reference to it in Vol. II, 1916, p. 158, twenty-two scales round the body should read twenty-four.

Genus **Dibamus**

Dibamus novae-guineae, Boulenger, p. 99.

Sub-order SERPENTES
OPHIDIA, p. 100.

Family **Typhlopidae**

Genus **Typhlops**

Typhlops lineatus, Boulenger, p. 102.

This species has not been found north of Bangnara, Patani.

Typhlops braminus, Boulenger, p. 103.

Typhlops albiceps, Boulenger, p. 103.

Typhlops bothriorhynchus, Boulenger, p. 104.

Typhlops diardi nigroalbus.

Typhlops nigroalbus, Boulenger, p. 104.
Typhlops diardi nigroalbus, M. A. Smith, Journ. N.H.S. Siam, VI, 1923, p. 52.

My reasons for making *T. nigroalbus* a race of *T. diardi* have already been stated (l.c.s.). All the specimens of *T. d. nigroalbus* which have been recorded from the Malay Peninsula, south of Patani, have 26 scales round the body. Examples from Bangnara, Patani have been obtained with only 24 scales round the body.

Typhlops mutilatus, Boulenger, p. 105.

Family **Boidae**

Genus **Python**

Python reticulatus, Boulenger, p. 107.

Python molurus, Boulenger, p. 108.

The occurrence of this species in the Malay Peninsula is still unproved. The reports of its presence are probably based on examples introduced by Indian snake-charmers.

Python curtus, Boulenger, p. 109.

Family **Ilysiidae**

Genus **Cylindrophis**

Cylindrophis rufus, Boulenger, p. 111.

Cylindrophis lineatus, Boulenger, p. 111.

Family **Xenopeltidae**

Genus **Xenopeltis**

Xenopeltis unicolor, Boulenger, p. 113.

Family **Colubridae**

Sub-family ACROCHORDINAE

Genus **Acrochordus**

Acrochordus javanicus, Boulenger, p. 115.

Genus **Chersydrus**

Chersydrus granulatus, Boulenger, p. 116.

Genus **Xenodermus**

Xenodermus javanicus, Boulenger, p. 117.

A specimen of this rare snake was obtained by Robinson and Kloss at Victoria Point in 1918. It has about 60 scales round the body, 170 ventrals and 120 subcaudals. It is a female. Colour, dark grey above, whitish below, the ventral shields grey at the margins.

Sub-family COLUBRINAE

Genus **Sibynophis**

Polyodontophis, p. 120.

Sibynophis, Fitzinger, Syst. Rept., p. 26, 1843, Stejneger, Proc. U. S. Nat. Mus., Vol. 38, p. 102 (1910).

Fitzinger's name of 1843 has precedence.

Sibynophis sagittarius is one of Cantor's records and is probably incorrect. The following characters will serve to distinguish the two species now definitely known to inhabit the Peninsula.

Parietal not in contact with the lower postocular: a black nuchal spot, bordered with yellow behind	*collaris.*
Parietal in contact with both postoculars; no nuchal spots	*geminatus.*

Sibynophis geminatus.

Polyodontophis geminatus, Boulenger, p. 120; M. A. Smith, Journ. N.H.S. Siam, II, 1916, p. 158 (Patani).

Sibynophis geminatus, Sworder, S'pore. Nat., 1922, p. 60 (Singapore).

This snake is common at Bangnara, Patani, but has not been met with farther north.

Sibynophis collaris.

Polyodontophis collaris, Boulenger, Cat. Sn. Brit. Mus., 1, p. 184 (1893); M. A. Smith, Journ. F. M. S. Mus., X, 1922, p. 265 (Guning Tahan).

Rostral twice as broad as high; suture between the internasals shorter than that between the prefrontals; frontal longer than its distance from the end of the snout, as long as or shorter than the parietals; loreal as long as high or a little longer; one pre-and two postoculars, the upper only in contact with the parietal; temporals 1 + 2 or 2 + 2; nine or ten supralabials, the fourth to sixth in contact with the eye; four infralabials in contact with the anterior pair of sublinguals which are about as long as the posterior.

Scales in 17 rows; ventrals 159 - 190; anal divided; subcaudals 100 - 131.

Brown above, the vertebral region greyish, usually with a series of small, round, black spots; head with dark spots or vermiculations and two transverse bars, one between the eyes and another across the occiput; a large black nuchal spot or band, bordered with yellow posteriorly; a black line along the side of the head above the light upper lip. Below yellowish, each ventral scale with an outer black spot or streak, which may be confluent on the posterior part of the body; ventrals anteriorly usually with median dots in addition.

Total length 760 mm.; tail 235 mm.

Range. The Himalayas (as far west as Simla) and the Indo-Chinese Peninsula. A specimen was obtained at Padang on Gunong Tahan in 1921. It is considerably darker in colour than examples found further north.

Genus **Xenochrophis**

Xenochrophis cerasogaster, Boulenger, p. 121.

Genus **Natrix**

Tropidonotus p. 122.

Natrix, Laurenti, Syn. Rept., p. 73 (1768).

Four species are added.

KEY TO THE SPECIES

I. Posterior maxillary teeth not abruptly enlarged.

Internasals much narrowed in front; nostrils directed upwards; 1 or 2 labials touching the eye; 2 superposed anterior temporals ...	*piscator*
Internasals narrowed anteriorly; nostrils supero-lateral; 3 labials touching the eye; 1 anterior temporal; subcaudals 120 - 126	*groundwateri.*
Internasals broadly truncate in front; nostrils lateral; 3 labials touching the eye; 2 superposed anterior temporals	*trianguligera.*
Internasals broadly truncate in front; nostrils lateral; 3 labials touching the eye; one anterior temporal; subcaudals 40 - 54 ...	*conspicillata.*
Internasals broadly truncate in front; nostrils lateral; two labials touching the eye; a single anterior temporal; subcaudals 96 - 103 ...	*inas.*

II. Last 2 or 3 maxillary teeth abruptly enlarged; scales in 19 rows.

A. Eye moderate or large; subcaudals 50 – 93.

Internasals much narrowed in front; a single anterior temporal; scales of outer row smooth; dorsum with 2 longitudinal yellow stripes ... ... *stolata.*

Internasals slightly narrowed in front; 2 superposed anterior temporals; scales of outer row smooth; labials white with (usually) a black spot below the eye; dorsum not barred or banded. ... ... *subminiata.*

Internasals broadly truncate in front; 2 superposed anterior temporals; all the scales strongly keeled; labials with black sutures; dorsum with short dark cross-bars or light spots ... ... *chrysarga.*

Internasals broadly truncate in front; usually a single anterior temporal; outer row of scales usually keeled; labials white with 2 oblique dark spots at the eye; dorsum with narrow black cross-bars ... ... *nigrocincta.*

B. Eye very large; subcaudals 95 – 113 ... *maculata.*

III. Last 2 or 3 maxillary teeth abruptly enlarged; scales in 17 rows ... ... *saravacensis.*

Natrix piscator.

Tropidonotus piscator, Boulenger, p. 123.

Natrix groundwateri.

M. A. Smith, Journ. N.H.S. Siam, IV, 1922, p. 205, pl. 8.

Maxillary teeth 30, the last two or three not abruptly enlarged, head distinct from neck; eye moderate; body slender. Rostral much broader than high; internasals narrowed anteriorly, as long as the prefrontals; nostrils superolateral between two nasals; frontal a little longer than broad, as long as its distance from the end of the snout, much shorter than the parietals; loreal twice as long as high; two pre- and two or three postoculars; temporals 1 + 2; nine supralabials, the fourth to sixth touching the eye; five infralabials in contact with the anterior pair of sublinguals, which are as long as the posterior pair.

Scales in 19 rows at the middle of the body, reduced to 17 immediately afterwards, smooth anteriorly, feebly keeled posteriorly. Ventrals 147 – 154; anal single; subcaudals 120 – 126.

Black above with a dorso-lateral chain of yellow spots; scale-rows 1 and 2 with yellow centres; labials yellow with black sutures and a yellow streak from the angle of the mouth to the nape. Below yellowish, with a black spot at the outer edge of each ventral and subcaudal shield.

Total length 450 mm.; tail 165 mm.

Still known only from the type locality Tasan, near Chumporn.

The precise status of this snake is still undetermined, as it has not been possible to make a complete examination of the maxillary teeth. It is provisionally placed under *Natrix* as in all other characters it agrees with that genus.

Natrix trianguligera.

Tropidonotus trianguligerus, Boulenger, p. 125.

Natrix trianguligera, M. A. Smith, Journ. N.H.S. Siam, II, 1916, p. 159 (P. Siam); Sworder, S'pore. Nat., 1922, p. 61.

I have seen a specimen from the Nakon Sritamarat district. Wall records it from the Thayetmyo district, Burma, (Journ. Bombay, N.H.S., XXXI, 1926, p. 560).

Natrix inas.

Tropidonotus inas, Boulenger, p. 125; M. A. Smith, Journ. N.H.S. Siam, II, 1916, p. 159.

I obtained a second specimen of this snake in the Nakon Sritamarat mountains in 1916, V. 148, C. 103.

Total length 380 mm.; tail 120 mm.

Natrix conspicillata.

Tropidonotus conspicillatus, De Rooij, Rept. Indo-Austral. Archipel., II, 1917, p. 83; Boden Kloss, Journ. F. M. S. Mus., VI, 1915, p. 41.

Eye moderate; nasal entire or partly divided; rostral scarcely visible above; internasals broadly truncate anteriorly, about as long as the prefrontals; frontal longer than its distance from the tip of the snout, shorter than the parietals; loreal higher than long; one pre- and three postoculars; temporals 1 + 2 or 3; eight supralabials. the third to fifth touching the eye; four or five lower labials in contact with the anterior pair of sublinguals, which are shorter than the posterior pair. Scales in 19 rows, all keeled except the outer row. Ventrals 138 to 153; anal divided; subcaudals 40 – 54.

Brown or reddish-brown above, with a dark network and two longitudinal series of yellow spots or transverse lines; head brown with or without small, yellow, dark-edged spots; a yellow, black-edged streak on the upper lip, another from the eye to the corner of the mouth; nape dark, usually with two interrupted yellow transverse streaks. Lower surface yellow, uniform or dotted with brown.

Total length 400 mm.; tail 75 mm.

Kloss records a specimen obtained at Genting Sempah, Selangor-Pahang boundary (alt. 2,000 ft.). The species is otherwise known from Sumatra, Borneo and the Natuna Islands.

Natrix stolata.

Tropidonotus stolatus, Boulenger, p. 125.

Natrix subminiata.

Tropidonotus subminiatus, Boulenger, p. 126.

Natrix subminiata, Sworder, S'pore. Nat., No. 3, 1924, p. 21 (Singapore).

Natrix chrysarga.

Tropidonotus chrysargus, Boulenger, p. 127; M. A. Smith, Journ. F. M. S. Mus., X, 1922, p. 265 (Pahang Mts.).

In addition to the localities mentioned by Boulenger this snake has been obtained on Gunong Tahan, Bukit Fraser, at Koh Rah and in the Nakon Sritamarat mountains.

Natrix nigrocincta.

Tropidonotus nigrocinctus, Boulenger, Fauna Brit. Ind., p. 346 (1890).

Natrix nigrocinctus, M. A. Smith, Journ. N.H.S. Siam, IV, 1922, p. 206.

Eye rather large, its diameter greater than its distance from the nostril; rostral visible from above; internasals truncate anteriorly, shorter than the prefrontals; frontal longer than its distance from the end of the snout, shorter than the parietals; loreal a little longer than high; one or two preoculars and three or four postoculars; temporals 1+2 or 2+2; nine, rarely eight, supralabials the fourth, fifth and sixth touching the eye; five infralabials in contact with the anterior pair of sublinguals, which are shorter than the posterior pair.

Scales in 19 rows, the outer row keeled or smooth. Ventrals 150–157; anal divided; subcaudals 72–82.

Greyish or green above, green towards the head, with narrow transverse black bars which may be interrupted on the vertebral line; an oblique black streak below the eye, another behind the eye and a third on the side of the neck; lower parts yellowish, speckled with grey or brown or almost entirely grey.

Total length 400 mm.; tail 180 mm.

Specimens were obtained by Robinson and Kloss at Tasan, Tapli and Chumporn (Isthmus of Kra). The description here given applies to Peninsula examples only. A more detailed account of the forms found farther north has been given by me in Journ. N.S.H. Siam, IV, 1922, p. 207.

Natrix maculata.

Tropidonotus maculatus, Boulenger, p. 128.

Natrix maculata, Sworder, S'pore. Nat., July 1922, p. 61 (Singapore).

Natrix saravacensis.

Tropidonotus saravacensis, De Rooij, Rept. Indo-Austral. Archipel., II, 1917, p. 85; Kloss, Journ. F. M. S. Mus., VI, 1915, p. 42.

Head distinct from neck, eye large; rostral not or just visible from above; internasals truncate anteriorly, as long as or slightly shorter than the prefrontals; frontal longer than its distance from the end of the snout, shorter than the parietals; loreal higher than long; one pre- and three postoculars; temporals 2+2 or 2+3; eight supralabials, the third to fifth touching the eye; five or six infralabials in contact with the anterior pair of sublinguals which are shorter than the posterior pair.

Scales in 17 rows, all strongly keeled; ventrals 136–154; anal divided; subcaudals 52–89.

Olive-brown above, with a series of dark, transverse bars, and two series of yellow spots or yellow stripes; or blackish above with orange spots anteriorly; head vermiculated with black; lips with black sutures. Below chequered with black and yellow, the black sometimes predominating.

Total length 560 mm.; tail 160 mm.

Recorded by Kloss from Mount Menuang Gasing, Selangor-Pahang boundary. A second specimen has been recently obtained at Tanah Rata in the Cameron's Highlands by Mr. Wilkins of the F. M. S. Agricultural Department, and is now in Raffles Museum. It is a male, and differs from other specimens recorded in having only 7 supralabials, due to fusion of the fourth and fifth shields, and in having only a single anterior temporal on the right side. Ventrals 141, caudals 75. The species is otherwise known from Borneo.

Genus Macropisthodon

Macropisthodon flaviceps.

Boulenger, p. 128; M. A. Smith, Journ. F. M. S. Mus., X, 1922, p. 266 (Kuala Tahan).

I have examined a specimen from the hills near Bandon, which appears to be the farthest record north.

Macropisthodon rhodomelas.

Boulenger, p. 129; M. A. Smith, Journ. N.H.S. Siam, II, 1916, p. 160 (Nakon Sritamarat) and Journ. F. M. S. Mus., X, 1922, p. 265 (Gunong Tahan); Sworder, S'pore. Nat., No. 2, 1922, p. 63 (Singapore).

Nakon Sritamarat is the most northerly record of this species.

Genus **Helicops**

Helicops schistosus, Boulenger, p. 130.

Genus **Lycodon**

Lycodon aulicus.

Boulenger, p. 131; Sworder, S'pore. Nat., No. 2, 1922, p. 63 (Singapore); M. A. Smith, P.Z.S., 1927, p. 221.

Lycodon laoensis.

Boulenger, p. 132; M. A. Smith, Journ. N.H.S. Siam, II, 1916, p. 160.

Specimens of this snake have been obtained at Bangnara, Patani, and in the Nakon Sritamarat mountains.

Lycodon effrenis, Boulenger, p. 132.

Lycodon butleri, Boulenger, p. 133.

Lycodon subcinctus.

Boulenger, p. 133; M. A. Smith, Journ. N.H.S. Siam, II, 1916, p. 160 (Patani); Sworder, S'pore. Nat., No. 2, 1922, p. 62 (Singapore).

This snake has been found widely distributed over the Indo-Chinese peninsula, ranging north as far as Hainan. A specimen was obtained by the F. M. S. Museums on Gunong Tahan at 5,400 feet altitude. The temporal shields are 2 + 2 and five infralabials are in contact with the anterior sublinguals.

Genus **Dryocalamus**

The Indo-Chinese *D. davisonii* Blanford, has been found just north of the Isthmus of Kra and will probably be found in the region included in this work.

Dryocalamus subannulatus, Boulenger, p. 134.

Genus **Zaocys**

Zaocys, Boulenger, p. 135.

Ptyas (in part), Wall, Journ. Bombay, N.H.S. XXIX, 1923, p. 617.

Zaocys carinatus.

Boulenger, p. 135; M. A. Smith, Journ. N.H.S. Siam, II, 1916, p. 160 (Patani, Nakon Sritamarat Mts.); Sworder, S'pore. Nat., No. 2, 1922, p. 62 (Singapore).

The range of the species extends to Tavoy and northern Siam.

Zaocys fuscus.

Boulenger, p. 136; Sworder, S'pore. Nat., 1922, No. 2, p. 162 (Singapore).

Sworder records a specimen recently killed in Singapore.

Genus **Ptyas**

Zamenis, (in part), p. 136.

Ptyas, Fitzinger, Syst. Rept., p. 26 (1843); Günther, Rept. Brit. Ind., p. 248 (1864); Stejneger, Herpet. Japan. p. 345 (1907); (in part), Wall, Journ. Bombay, N.H.S. XXIX, 1923, p. 617.

The genus *Ptyas* has been separated from *Coluber* (the *Zamenis* of Boulenger) in having two or three loreal scales instead of a single shield. It contains two species only, namely *P. mucosus* and *P. korros*. *Z. fasciolatus* (p. 138) mentioned by Boulenger, need not be considered here. It is a native of India and the specimen recorded by Cantor from Province Wellesley was almost certainly never obtained there. (*See* also Wall in Journ. Bombay N.H.S., XXIX, 1923, p. 619).

On the grounds that *Coluber mucosus* Linn., has the characters generally associated with *Zaocys* (dorsal scales in regular rows) and is the type of the genus *Ptyas*, Wall has sunk *Zaocys* Cope, 1860, in favour of *Ptyas* Fitzinger, 1843. Although many specimens of *mucosus* have the scales in regular rows on the middle and posterior part of the body the character is not constant, nor does it occur throughout the whole of the body as in *Zaocys*. I prefer to retain *C. mucosus* under *Ptyas*, regarding it as a species connecting that genus with *Zaocys*.

Ptyas korros.

Zamenis korros, Boulenger, p. 137.

Ptyas korros, M. A. Smith, Journ. N.H.S. Siam, II, 1916, p. 160 (Patani and Nakon Sritamarat); Sworder, S'pore. Nat., No. 2, 1922, p. 62.

Sworder records it as common on Singapore Island. I have examined specimens from Bangnara, Patani and Nakon Sritamarat, and Robinson and Kloss obtained a specimen at Tapli (Isthmus of Kra).

Ptyas mucosus.

Zamenis mucosus, Boulenger, p. 137.

Genus **Xenelaphis**

Xenelaphis hexagonotus, Boulenger, p. 139.

Genus **Elaphe**

Coluber, p. 139.

Elaphe, Fitzinger, in Wagler's Desc. et Icon. Amphib. pt. III, pl. XXVII and text, 1833 (type *E. parreysii* Fitz=*Coluber quatuorlineatus* Lacepéde); Stejneger, Herpet. Japan, p. 307 (1907).

One species, *E. prasina* is to be added. It can be distinguished from the other species in the Peninsula with 19 scale-rows by its bright green coloration.

Elaphe porphyracea.

Coluber porphyraceus, Boulenger, p. 140.

An example has recently been obtained on Cameron's Highlands, 4,500 ft., by Commander Buddle, R. N. The evidence for its existence in the Malay Peninsula previously rested upon Cantor's specimen of *Psammophis nigrofasciatus* which was said to have been obtained in Singapore. Apart from the unreliability of many of Cantor's records the species is a mountain form and has been found so far only at high altitudes. The record from Sumatra. (Hubrecht, in Snelleman, Nat. Hist. Midden-Sumatra, Rept., 1887, p. 5, pl. —), however, appears to be a very definite one. The most southerly record of its occurrence hitherto on the Asiatic mainland that I know of is a specimen captured on Doi Suthep (N. Siam) by Dr. W. E. Barnes of the Rockfeller Institute, Bangkok.

Elaphe flavolineata.

Coluber melanurus (non Shaw. 1802), Boulenger. p. 141; M. A. Smith, Journ. N.H.S. Siam, II, 1916, p. 160 (Patani).

Elaphe melanurus, Sworder, S'pore. Nat., No. 2, 1922, p. 63 (Singapore).

Coluber flavolineata Reinwardt, Bull. Sci., IX, 1826, p. 237 (nom. nud.), Schlegel, Des Serpens, II, 1837, p. 141.

I have already (1916) commented on the distribution of this snake on the Asiatic mainland. Wall records it from Tenasserim (Journ. Bombay N.H.S., XXIX, 1923, p. 621) and this appears to be the most northerly record that is authentic.

Elaphe radiata.

Coluber radiatus, Boulenger, p. 141.

Elaphe prasina.

Coluber prasinus, Boulenger, Cat. Sn. Brit. Mus., II, p. 50 (1894); M. A. Smith, Journ. F. M. S. Mus., X, 1922, p. 266 (Gunong Tahan).

Maxillary teeth 20 to 22; eye moderate. Rostral broader than high, visible from above; internasals considerably smaller than the prefrontals; frontal longer than broad, as long as its distance from the rostral or the end of the snout, shorter than the parietals; loreal longer than high; one preocular (rarely divided) in contact with or separated from the frontal; two postoculars; temporals 2 + 2, rarely 1 + 2; nine, sometimes eight, supralabials, the fourth, fifth and sixth or fourth and fifth only touching the eye; five infralabials in contact with the anterior pair of sublinguals which are about as long as the posterior pair.

Scales in 19 rows; the dorsals feebly keeled in the adult, smooth in the young. Ventrals angulate laterally, 198 – 207; anal divided (rarely entire); subcaudals 91 to 107.

Uniform bright green above, the interstitial skin with black and white reticulations; upper lip and lower parts yellowish or greenish white; sometimes a white line along the outer margin of the ventrals.

Total length 1140 mm.; tail 275 mm.

Range. From the Eastern Himalayas to Tonkin and the Malay Peninsula. A specimen was obtained by an F. M. S. Museums expedition on Gunong Tahan.

Elaphe taeniura grabowskyi

Elaphis grabowskyi, Fischer, Arch. fur Natur., 1885, p. 59, pl. IV, fig. 3.

Coluber taeniurus, Boulenger, p. 142.

Elaphe taeniurus, Stejneger, Herpet. Japan, p. 319 (1907).

Elaphe taeniura, Sworder, S'pore. Nat., No. 2, 1922, p. 63.

Coluber taeniurus var. *ridleyi*, Butler, Journ. Bombay N.H.S., XII, 1899, p. 426.

As pointed out by Stejneger (1907) several forms of this snake can be defined when it is considered over its whole range. The typical form from the Himalayas and China has 23 or 25 scale rows, 226 to 258 ventrals and 90 to 114 subcaudals. A southern form ranging through Siam, the Malay Peninsula and Archipelago has an average of more scale-rows and has more ventrals. The following table of variation is drawn up from the material available to me, but the series is too small except for that from the Malay Peninsula to draw definite conclusions.

Region	*Scale-rows*	*Ventrals*	*Sub-caudals*	*No. examined*
—	—	—	—	—
Siam	25	276 – 290	91 – 103	3
Malay Peninsula ...	25	288 – 305	102 – 112	12
Malay Archipelago ...	25 – 27	278 – 284	94 – 98	4

For the present I name them all *E. t. grabowskyi* (type locality Borneo) although a bigger series from the Malay Archipelago may shew that the Peninsular form can be separated, in which case *ridleyi* would stand for the latter.

The specimen referred to by Sworder (1922) appears to belong to the typical form. It has 23 scale-rows, 230 ventrals and 112 subcaudals.

LIST OF SPECIMENS EXAMINED.

		Sc. rows	*Vents.*	*Caud.*
B.M. 97. 5. 10. 1–3	Caves, Kuala Lumpor.	♂ 25.	299	108
		♂ 25.	288	?
		♀ 25	291	102
B.M. 1903. 4. 13. 72	Batu Caves	♀ 25.	289	106
B.M. 1906. 2. 28 21	K. Teku, Pahang, juv.	25	305	108
B.M. 97. 12. 28. 51	Johore Bahru.	♀ 25	293	105
Raffles Mus. 1	Batu Caves.	25	295	96 (impf.)
2		25	291	?
3		25	294	112
4		25	296	108
5	Johore	25	305	102
*6	Kedah Peak 3,300′	25	305	110
B.M. 86. 5. 15. 20. 22	S. E. Borneo (types of *grabowskyi*)	♂ 25	282	94
		♂ 25	278	98
B.M. 79. 7. 2. 3	Pajo, Sumatra	25	282	97
B.M. 1915. 12. 2. 35	Korinchi, Sumatra, juv.	27	284	97

Elaphe oxycephala.

Coluber oxycephalus, Boulenger, p. 143; M. A. Smith, Journ. F. M. S. Mus., X, 1922, p. 266 (Kuala Tahan).

Gonyosoma oxycephala, Sworder, S'pore. Nat., No. 2, 1922, p. 64 (Singapore).

Coluber floweri Werner, SB. Ak. Wiss. Wien, Abt. 1, Band 134, 1925, p. 55; M. A. Smith, Ann. Mag. Nat. Hist., (10) I, 1928, p. 497 (*floweri*=*oxycephala*).

I have examined a specimen from Bangnara, Patani. The range of the species extends into Annam (Langbian plateau).

Coluber floweri Werner, I regard as a colour-form of *E. oxycephala*. In addition to the type in the Natural History Museum, Vienna, there are four more specimens in the British Museum. This variety is never green, but has the head and body above of a light or dark buff colour and is marked all over with scattered, irregular blotches of dark brown or black. The belly is whitish, uniform, or with dark markings similar to those upon the upper parts. The tail which is paler in colour and has no dark

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*This specimen was taken on Kedah Peak, at 3,300 ft., by Mr. H. M. Pendlebury on 13th March, 1928.

markings at all, is abruptly marked off from the body coloration as in the typical form.

Hewitt (J. Straits Br. Asiat. Soc., 1906, p. 282) records a specimen (presumably from Borneo), of a uniform brownish colour dorsally, pale yellowish ventrally. It appears to be the same form without any dark markings.

SPECIMENS OF COLOUR-VAR. *floweri* EXAMINED.

Museum.	*Locality.*	*Sex*	*Sc. rows.*	*Vents.*	*Cauds.*
Vienna (type) ...	Singapore.		25	246	147
B.M. 1906. 7.18.1 ...	Kuala Kelantan.	♂	25	238	134
B.M. 1902. 12.12.24 ...	Trang, S. Siam.	♂	25	237	120 (impf.)
B.M. 1903. 6.13.1 ...	Dindings.	♂	25	247	136
B.M. (Gen. Hardwicke d.)	?	♂	23	238	139

Genus **Gonyophis**

Gonyophis margaritatus, Boulenger, p. 144.

Genus **Ahaetulla**

Ahaetulla (part.) Gray, Ann. Philos., 1825. X, p. 208.

Dendrophis (part.) Boie, Isis, 1827, pp. 520, 541; Boulenger, p. 145.

Ahaetulla has priority over *Dendrophis* and there appears to be no reason why it should not be used. Moreover as the type of *Dendrophis* is specifically named by Boie as *Coluber ahaetulla* Linn., =*Leptophis liocercus* Wied=*Leptophis ahaetulla* Linn., (see Andersson, Bihang K. Sv. Vet. Akad. Handl. Stockholm, 1899, Bd. 24, Afd. 4, No. 6, p. 22), *Dendrophis* cannot be used for the genus now under consideration. The type of *Ahaetulla* will be *Coluber decorus* Shaw=*Coluber pictus* Gmelin.

Ahaetulla picta.

Dendrophis pictus, Boulenger, p. 145; Sworder, S'pore. Nat., No. 2, 1922, p. 64 (Singapore); M. A. Smith, J. F. M. S. Mus., X, 1922, p. 266 (Kuala Teku).

Coluber pictus Gmelin was published in 1789 and not 1788 as stated. In the same year appeared Lacepede's *Coluber boiga* (Hist. Nat. Serp., II, p. 223, pl. 9) which appears to be identical with *pictus*. As there appears no means of ascertaining which name has priority I have retained the one which has been in general use for the last 100 years.

Ahaetulla formosa.

Dendrophis formosus Boulenger, p. 146; M. A. Smith, Journ. N.H.S. Siam II, 1916, p. 161 (Patani); Sworder, S'pore. Nat., No. 2, 1922, p. 64 (Singapore).

Mr. C. J. Aagaard obtained a specimen at Bangnara in Patani, and I have seen another from Benang Star in the same State. The species is widely distributed in Siam.

Genus **Dendrelaphis**

One species, *D. subocularis*, is added. It can be distinguished from *D. caudolineatus* by having only 15 scale-rows.

Dendrelaphis caudolineatus.

Boulenger, p. 147; M. A. Smith, Journ. N.H.S. Siam, II, 1916, p. 161 (Patani); Sworder, S'pore. Nat., No. 2 1922, p. 64 (S'pore.).

As already stated (1916) there is no evidence to shew that this species occurs outside the Malayan area. Robinson and Kloss obtained a specimen at Klong Wan, Tapli (Isthmus of Kra), north of which locality it has not been found.

Dendrelaphis subocularis.

Boulenger, Cat. Sn. Brit. Mus., II, p. 89 (1894).

Eye as long as its distance from the nostril. Rostral broader than high, visible from above; internasals nearly as long as the prefrontals; frontal longer than broad, longer than its distance from the end of the snout, a little shorter than the parietals; loreal elongate; 1 pre- and 2 postoculars; temporals 2+2; 7 or 8 supralabials, the fourth or fifth very large and bordering the eye; 4 or 5 infralabials in contact with the anterior pair of sublinguals, which are much longer than the posterior pair. Scales in 15 rows; ventrals 150-172; anal divided; subcaudals 74-105.

Bronze-brown above, the colour extending to and including the outer margin of the ventral shields but interrupted by a light lateral streak on the inner half of scale-row 1 and outer half of scale-row 2. A black line behind the eye continued (in the young) on to the nape as a series of black spots or short transverse bars. Lips yellow with black sutures. Below pearly-white; subcaudals metallic citrine.

Total length 845 mm.; tail 235 mm.

Range. The types are from Bhamo, Upper Burma and the species is widely distributed throughout Siam. Robinson and Kloss obtained a specimen at Tasan (Isthmus of Kra).

Genus **Oligodon**

Simotes, p. 147.

Oligodon Boie, Isis, 1827, p. 519.

Holarchus (part), Stejneger, Herpet. Japan, p. 353 (1907).

Oligodon Wall, Rec. Ind. Mus., XXV, 1923, p. 305.

As suggested by Gunther and Boulenger and shewn in greater detail by Wall, there is no clear line of demarcation between *Oligodon* and *Holarchus* (=*Simotes*, preoccupied), the former being characterized by fewer teeth and, usually, a reduction in the number of scale-rows.

Oligodon purpurascens.

Simotes purpurascens, Boulenger, p. 148; M. A. Smith, Journ. N.H.S. Siam, II, 1916, p. 161.

Holarchus purpurascens, Sworder, S'pore. Nat., nos. 3 and 4, 1922, p. 21 (Singapore).

Holarchus cyclurus, Sworder, S'pore. Nat., nos. 3 and 4, 1922, p. 21,

Oligodon purpurascens, Wall, Rec. Ind. Mus., XXV, 1923, p. 328.

Wall is probably correct in making *O. cyclurus* a sub-species of *O. purpurascens*, but there are more differences between them than he makes out. The normal scale formula for *O. purpurascens* (type locality Java) which ranges throughout the Malay Peninsula and Archipelago is 19.19.17 or 15 (counting the scale-rows at the neck, the middle of the body and before the vent respectively). Occasional individuals have 20 or 21 scales on the middle of the body, but they are rare. This form inhabits the Peninsula as far north as Patani, but north of this locality and for a distance of nearly 300 miles, there is a region in which no species of the genus has yet been obtained. At Bangtaphan (Lat. 11′ 15° N.) a snake is to be found resembling *purpurascens*, except that it has a scale formula of 21. 21. 19 or 17, and this form—the *Simotes cyclurus* (in part) of Boulenger—ranges over the whole of Siam, its scale-formula being the same throughout the country. Further north still, in Burma, it again reverts to the scale formula of 19. 19. 17 or 15 and although its coloration there is somewhat different, it would be difficult at times to distinguish between Burmese examples and those found in the Malay Peninsula.

Oligodon purpurascens (*forma typica*), therefore, should be the name for the form found in the Malay Peninsula and Archipelago, and *O. purpurascens cyclurus**, has no place in the peninsular fauna at all. The types of *Simotes catenifer* Stoliczka, upon which Boulenger bases his record of *cyclurus*, came from Penang and

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*The type of *Coronella cyclura* Cantor is lost, but a coloured drawing of the snake, signed by Cantor, is in the Bodleian Museum, Oxford. It is No. 15 of the series. Gunther (Rept. Brit. Ind., p. 218) has doubted if this drawing represents a species of *Oligodon* at all, but it appears to me to be a good illustration of one colour-form of *O. p. cyclurus*

Johore respectively, and according to the original description they have 19 scale-rows at midbody and agree in other characters with the Malayan form. *S. catenifer* was originally placed by Boulenger in the synonymy of *purpurascens* (Cat. Sn. Brit. Mus., II, p. 218 (1894)) and I do not know his reason for placing it later under *cyclurus*.

LIST OF SPECIMENS OF *O. purpurascens* EXAMINED.

Malay Peninsula

		Scale-rows.	*Vents.*	*Caudals.*
Smith, coll. Bangnara, Patani.	♀	19. 19. 15	192	55
	♀	19. 19. 17	180	53
	♀	19. 19. 15	187	53
	♂	19. 19. 15	175	60
F. M. S. Mus., Perhentian Is., Trengganu	♂	19. 19. 15	181	52
B.M. 1908, 7. 8. 1., Kelantan ...	♀	21. 21. 17	191	57
B.M. 1906, 7. 18. 3., ,, ...	♀	19. 19. 17	190	55
B.M. 1909, 2. 27. 5., ,, ...	juv.	19. 19. 15	179	57
B.M. 98. 9. 22. 33-4, Penang ...	♂	19. 19. 15	179	54
	♂	19. 19. 15	177	56
B.M. 63. 3. 19.1019, ,, ...	♀	19. 21. 17	190	53
B.M. 96. 6. 25. 43, P. Wellesley	♂	19. 19. 15	180	56
F. M. S. Mus., Ayer Itam, Selangor	♀	19. 19. 15	184	?
F. M. S. Mus., Jelebu, N. Sembilan	♂	19. 19. 15	182	56
B.M. 83. 11. 28. 13, Singapore.		19. 20. 17	186	54
Raffles Mus., Singapore ...	♀	19. 21. 15	185	52
Raffles Mus., Sungei Dohol, Johore	♀	19. 21. 17	183	55
Raffles Mus., Tebrau, Johore.	♀	19. 19. 15	186	54
Raffles Mus., Kuala Lumpur.	juv.	19. 19. 15	188	58
Raffles Mus., Kuala Lumpur.	♀	19. 21. 15	183	?
Raffles Mus., Pulau Gallang, Rhio Archipelago ...	♂	19. 19. 17	173	53

Borneo

		Scale-rows.	*Vents.*	*Caudals.*
B.M. 1904, 7. 2. 3, Sarawak ...	♀	19. 19. 17	173	48
B.M. 64. 7. 5. 10, Borneo (type of *S. labuensis*) ...	♂	19. 21. 15	171	?
B.M. 1911, 1. 30. 21, Sarawak	♂	19. 19. 15	164	51
B.M. 1910, 1. 12. 14, Barito R., Borneo	♂	19. 19. 15	170	49
B.M. 96. 4. 28. 8, Kina Balu ...	♂	19. 19. 15	168	46
B.M. 72. 2. 19. 47, Matang ...	♂	19. 19. 15	169	51

Sumatra

B.M. 1920. 1. 16. 20. Bencoolen	♀	19. 19. 15	176	43
B.M. 89. 11. 12. 2, Deli ...	♂	19. 21. 15	165	53
B.M. 89. 12. 26. 8 ,, ...	?	19. 21. 15	166	53
B.M. 84. 1. 8. 40, Nias ...	♂	17. 19. 15	170	?
B.M. 85. 5. 4. 6, ,, ...	♀	19. 19. 15	174	52

An analysis of the above material shews that the form from the Malay Archipelago has fewer ventrals and subcaudals and fewer and broader dorsal spots than the one from the Malay Peninsula, so that if one cares to split further the name for the form in the Peninsula will be *catenifer*.

Malay Archipelago.

♂ Ventrals 164 to 171; subcaudals 46 to 53.
♀ Ventrals 173 to 176; subcaudals 43 to 52.
9 to 11 spots on the body and 3 or 4 on the tail (*purpurascens*).

Malay Peninsula.

♂ Ventrals 175 to 180; subcaudals 54 to 60.
♀ Ventrals 180 to 192; subcaudals 53 to 57.
11 to 13 spots on the body and 4 or 5 on the tail (*catenifer*).

Oligodon octolineatus.

Simotes octolineatus, Boulenger, p. 149.
Holarchus octolineatus, Sworder, S'pore. Nat., nos. 3 and 4, 1922, p. 64 (Singapore).

The record of this snake in southern India is no doubt incorrect.

Oligodon signatus.

Simotes signatus, Boulenger, p. 150.
Holarchus signatus, Sworder, S'pore. Nat., No. 2, 1922, p. 64 (Singapore).

Oligodon cruentatus.

Simotes cruentatus, Boulenger, p. 150.

There is a specimen of unknown origin in the Selangor Museum.

Genus **Gongylosoma**

Ablabes, p. 151.

Gongylosoma Fitzinger, Syst. Rept., 1843, p. 25; Stejneger, Meddel. Zool. Mus., Kristiania, No. 2, 1914, p. 2.

One species, *G. scriptum,* is added.

KEY TO THE SPECIES

Scales in 15 rows	*tricolor.*
Scales in 13 rows	
Ventrals 115 - 137; subcaudals 58 - 75; 7 supralabials	*baliodeirum.*
Ventrals 117 - 145; subcaudals 89 - 96; 8 supralabials; a narrow white collar succeeded by a dark patch (present or absent)	*scriptum.*
Ventrals 110 - 122; subcaudals 77 - 103; a light V-shaped mark on the neck and three light lines anteriorly	*longicauda.*

Gongylosoma tricolor.

Ablabes tricolor, Boulenger, p. 151.

Gongylosoma tricolor, Sworder, S'pore. Nat., No. 2, 1922, p. 64 (Singapore).

Gongylosoma baliodeirum.

Ablabes baliodirus, Boulenger, p. 152.

Gongylosoma baliodeirum, Sworder, S'pore. Nat., No. 2, 1922, p. 65 and no. 3, 1921, p. 22 (Singapore).

Gongylosoma scriptum.

Ablabes scriptus, Theobald, Journ. Linn. Soc. X, 1868, p. 42; Boulenger, Cat. Sn. Brit. Mus., II, p. 284 (1894).

Rostral broader than high, visible above; nasal divided; diameter of the eye three-fourths the length of the snout; internasals shorter than the prefrontals; frontal longer than its distance from the end of the snout, shorter than the parietals; loreal very small, sometimes absent; 1 pre- and 2 postoculars; temporals 1+2, the anterior in contact with both postoculars; 8 supralabials, the third to fifth touching the eye, the seventh very long, as long as the anterior temporal; 7 or 8 infralabials, the first 4 in contact with the anterior pair of sublinguals which are shorter than the posterior pair.

Scales in 13 rows. Ventrals 117 - 145; anal divided; subcaudals 89 - 96.

Light brown above, with or without black dots on either side of the vertebral line in its anterior part; a black mark under the eye present or absent, followed by a white upright border involving the postoculars and a black patch behind it; a dark patch on the nape (present or absent) bordered in front and behind with white. Below white.

Total length 500 mm.; tail 175 mm.

In scale characters this species agrees almost exactly with *G. longicauda,* but the markings are different. At present only 4 specimens are known, namely the type from Martaban, Burma, one obtained by me in the Petchaburi district of Siam, a third collected by Robinson and Kloss at Telok Poh, Pulau Panjang, I. of Puket and a fourth by Dr. Hugh Smith on Khao Luang in the Nakon Sritamarat mountains. Further material may shew that it is only a race of *longicauda.* For the present I leave it distinct.

Gongylosoma longicauda.

Ablabes longicauda, Boulenger, p. 152.

Genus **Macrocalamus**

Macrocalamus lateralis.

Boulenger, p. 153; M. A. Smith, Journ. F. M. S. Mus., X, 1922, p. 266 (Gunong Tahan).

An example of this rare snake was captured at Padang, Gunong Tahan. The ventral count was 127 (not 172 as printed l.c.s. 1922).

Colour. Dark brownish above; a dark band from the eye to the last labial bordered above with yellow; two indistinct yellow V-shaped marks on the neck; labials yellow. Below yellow, spotted with black; a black line at the outer margin of the ventrals and a median one below the tail.

Genus **Pseudorabdion**

Pseudorhabdium, p. 154.

Pseudorabdion, Jan, Arch. Zool. Anat. Fis., Genova, II. 1862, p. 10.

Pseudorabdion longiceps.

Pseudorhabdium longiceps, Boulenger, p. 154; Sworder, S'pore. Nat., No. 2, 1922, p. 65 (S'pore.); M. A. Smith, Journ. N.H.S. Siam, II, 1916, p. 161 (Patani) and Journ. F. M. S. Mus., X, 1922, p. 267 (Fraser's Hill).

Sworder states it is common on Singapore Island. Mr. Aagaard also tells me it is common at Bangnara, Patani; it has not been recorded north of this locality.

Sworder records the sexual variation of this snake.

Genus **Calamaria**

One species *C. javanica* is added which, together with *Calamaria gimletti* which was inadvertently omitted from the key, must now be included. Both belong to the second part of Boulenger's synopsis.

II. Four upper labials, second and third touching the eye.
 A preocular ... ... *pavimentata.*
 No preocular—
  Ventrals 158 – 187 ... ... *javanica.*
  Ventrals 202 – 249 ... ... *gimletti.*

Calamaria vermiformis.

Boulenger, p. 155; M. A. Smith, Journ. N.H.S. Siam, II, 1916, p. 162.

Not recorded north of Patani.

Calamaria albiventer, Boulenger, p. 156.

Calamaria sumatrana.

Boulenger, p. 156; Sworder, S'pore. Nat., No. 2, 1922, p. 65.

The specimen in the Indian Museum (no. 13306) labelled Singapore, presented by Raffles Museum, appears to be the only record of this snake in the Malay Peninsula.

Calamaria leucocephala.

Calamaria leucocephala, Boulenger, p. 157; Sworder, S'pore. Nat., 1922, p. 65 (Singapore).

Calamaria agamensis Bleeker, Nat. Tijdschr. Ned. Ind., 1860, XXI, p. 292.

Sworder records the colour in life of two specimens obtained at Bukit Timah, Singapore, as "very dark blue above, white below, head coral pink".

Calamaria agamensis Bleeker, must now be regarded as identical with this species. It is clearly shewn by six specimens collected by Mr. E. Jacobson at Fort de Kock, central Sumatra, and presented recently by him to the British Museum of Natural History.

The characters separating *leucocephala* from *agamensis* are a preocular shield and a completely or partially white or pale head (pink in life). Out of 20 specimens of *leucocephala* in the British Museum collection, only 2 (from Singapore and Penang) have an all white head. In the remainder the white is confined to the posterior part of the head or is absent altogether, the top of the head being of the same colour as the upper part of the body. Mr. Jacobson's specimens shew a variable amount of colouring, the posterior portion of the head being more or less pale in all of them. In his series the preocular is absent in two specimens, present on both sides in two and present on one side only in the remaining two.

The variation in the ventral and subcaudal count in this species is very small if the sexes are considered apart, as is usual with *Calamaria*. The following are the counts of the Fort de Kock examples:—

	Vents.	*Cauds.*		*Vents.*	*Cauds.*
♂	127	27	♀	152	21
♂	133	24 ?	♀	152	21
♂	138	29			
♂	142	28			

Calamaria pavimentata.

Boulenger, p. 157; M. A. Smith, Journ. F. M. S. Mus., X, 1922, p. 267 (Gunong Tahan).

Calamaria gimletti.

Boulenger, p. 220; Sworder, S'pore. Nat. No. 5, 1925, p. 100 (Johore).

Sworder records a third example of this rare snake captured on Gunong Pulai, Johore. It has 249 ventral shields*.

Boulenger omits to record that the type-specimen had a total length of 265 mm.; tail 8 mm.

Calamaria javanica.

Calamaria javanica, Boulenger, Ann. Nat. Hist., (6) VII, 1891, p. 279; De Rooij, Sn. Indo-Austral. Archipel., II, 1917, p. 176; Wall, Rec. Ind. Mus., XXII, 1921, p. 729 (Johore).

Diameter of the eye about equal to its distance from the mouth; rostral as high as broad; frontal a little longer than broad, three to five times as broad as the supraocular, shorter than the parietals; no preocular, 1 postocular; 4 upper labials, the second and third touching the eye; first pair of infralabials in contact with one another behind the mental. Scales in 13 rows. Ventrals 151 – 186; subcaudals 15 – 17.

Light or dark brown above, uniform on each scale with a light dot; a yellow interrupted collar present or absent; lower surface yellowish or brownish.

Total length 207; tail 12 mm.

Wall refers a specimen in the Indian Museum captured at Johore to this species. Otherwise it is known from Java and Sumatra.

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*Sworder (Journ. Malay. Br., R.A.S., VII, 1929, p. 337 and text figures) records from Fraser's Hill a fourth specimen which I have seen. It has only 165 ventrals, no yellow spots on the tail but a large pair near the head. N. S.

Sub-family HOMALOPSINAE (p. 158)

With the exception of the Australian genus *Myron*, all the known genera of this subfamily have now been found in the Malay Peninsula.

KEY TO THE GENERA.

I. Ventrals well developed, not keeled.

A. Nasal shields in contact with one another.

Parietals well developed; scales smooth ... *Enhydris.*
Parietals well developed, scales strongly keeled *Homalopsis.*
Parietals more or less broken up; scales keeled ... *Cerberus.*

B. Nasals separated by an internasal.

Maxillary teeth 12 to 15, no edentulous space anteriorly; loreal present; body not elongate *Gerarda.*
Maxillary teeth 6 to 8, an edentulous space anteriorly; loreal normally absent; body not elongate ... ... *Fordonia.*
Maxillary teeth 10 to 13, an edentulous space anteriorly; loreal present; body very elongate *Cantoria.*

II. Ventrals very narrow, bicarinate.

Scales smooth ... ... *Hipistes.*
Scales keeled; two rostral appendages ... *Erpeton.*

Genus **Enhydris**
Hypsirhina, p. 158.

Enhydris Latreille, Hist. Nat. Rept., IV, p. 200 (1802); Stejneger, Herpet. Japan, p. 300 (1907).

As shewn by Stejneger, Latreille's *Enhydris* should be used for this genus, the type being Schneider's *Hydrus enhydris = Enhydris enhydris.*

Enhydris sieboldii Schleg., is probably incorrectly recorded as occurring in the Peninsula. See also Wall, in Journ. Bombay N.H. Soc., XXIX, 1924, p. 867.

Enhydris indica.

Hypsirhina indica, Boulenger, p. 159.

Since the publication of his work, Dr. Boulenger has identified a ♂ from near Taiping preserved in the Selangor Museum, (v. 165; c. 31) and a ♂ from Singapore in the Dublin Museum (v. 175; c. 34).

Enhydris plumbea.

Hypsirhina plumbea, Boulenger, p. 160; M. A. Smith, Journ. N. H. S. Siam, II, 1916, p. 162 (Patani).

Enhydris enhydris.

Hypsirhina enhydris, Boulenger, p. 160; M. A. Smith, Journ. N.H.S. Siam, II, 1916, p. 162 (Patani).

Enhydris enhydris, Sworder, S'pore. Nat., No. 2, 1922, p. 66.

Enhydris bocourti.

Hypsirhina bocourti, Boulenger, p. 161.

Hypsirhina gigantea Werner, Ann. Naturhist. Mus. Wien, XXXVI, 1923, p. 163; M. A. Smith, Ann. Mag. Nat. Hist., (10) I, 1928, p. 497.

Genus **Homalopsis.**

Homalopsis buccata, Boulenger, p. 162.

Genus **Cerberus**

Cerberus, Boulenger, p. 163.

Hurria, Stejneger, Herpet. Japan, 1907, p. 304.

Stejneger has revived Daudin's name *Hurria* for this genus on the grounds that "Doctor Boulenger identifies Russell's pl. XL as *H. rynchops*". This is not so. The plate XL to which Boulenger refers (Cat. Sn. Brit. Mus., 1896, Vol. III, p. 16) is in Vol. II of Russell, whereas plate XL to which Daudin refers is in Vol. I of Russell. Daudin refers to this snake again in his Hist. Nat. Rept., 1803, Vol. V., p. 284 under the name of *Hurria bilineata.*

The "Hurriah" of Russell, which was made by Daudin the exclusive type of his genus *Hurria*, (Mag. Encyclop. An. 8 V, 1803, p. 434) has never, as far as I am aware, been identified by anyone, and it certainly is not Schneider's *rynchops.* It was described and figured by Russell from a sketch of a head, neck and tail and a description, sent him by a correspondent. With its unusual subcaudal scutellation—the anterior plates being single and the posterior double—it should not be difficult to recognize if met with again. The name *Hurria* therefore based exclusively upon this specimen, cannot stand for the genus now under discussion and *Strephon* Goldfusz 1820, based upon the same specimen, stands in the same position. *Cerberus* Cuvier (Régne Animal, 2nd edit., 1829, vol. 2, p. 81), type *Coluber cerberus*, is correct.

Cerberus rynchops.

Cerberus rhynchops, Boulenger, p. 163; Wall, J. Bombay Nat. Hist. Soc., 1918, Vol. XXVI, p. 89, col. pl. XXVI.

Hurria rynchops Sworder, S'pore. Nat., No. 2, 1922, p. 86 (Singapore).

The original spelling is preserved.

This snake is very common at Selitar on Singapore Island and at Londang on the Perak coast.

Genus **Gerarda**

Gerarda Gray, Cat. Sn. Brit. Mus., p. 77 (1849).

Gerardia, Boulenger, Cat. Sn. Brit. Mus., III, p. 20 (1896).

Maxillary teeth 10 to 13, very small, followed by a pair of enlarged, grooved teeth; mandibular teeth subequal. Head small, not distinct from neck; eye small, with rounded pupil; head shields large; a single internasal separating the nasals; loreal present. Body cylindrical, moderately stout; scales smooth in 17 rows.

Gerarda prevostiana.

Coluber (Homalopsis) prevostianus Eyd. & Gerv. in Guer. Mag. Zool., Cl. III, 1837, pl. XIII.

Gerardia prevostiana, Boulenger, Cat. Sn. Brit. Mus., III, p. 20 (1896). Kloss, Journ. F. M. S. Mus., X, 1921, p. 201.

Two specimens of this snake were captured at Londang and another at Kuala Kurau, on the coast of Perak.

Genus **Fordonia**

Fordonia leucobalia.

Boulenger, p. 164; Kloss, Journ. F. M. S. Mus., X, 1921, p. 201; Sworder, S'pore. Nat., No. 2, 1922, p. 66 (Singapore).

A specimen of this snake captured at Changi, Singapore (Raffles Mus. Coll. No. 8127) has a loreal shield present on either side, due to division of the posterior extremity of the nasal.

Genus **Cantoria**

Cantoria violacea.

Boulenger, p. 165; Sworder, S'pore. Nat., No. 2, 1922, p. 66 (Singapore).

Wall records this species from the Andaman Islands and as far north in Burma as the mouth of the Irrawadi (Journ. Bombay N.H.S., XXIX, 1924, p. 867).

Genus **Hipistes**

Hipistes hydrinus, Boulenger, p. 166.

Genus **Erpeton**

Erpeton Lacépède, Bull. Sc. Soc. Philom., II. 1800, p. 169.

Herpeton, Boulenger, Cat. Sn. Brit. Mus., III. p. 25 (1896).

Maxillary teeth 12 to 14, followed, after a short interval, by a pair of slightly enlarged grooved teeth; mandibular teeth subequal. Head distinct from neck, with two rostral appendages which are covered with small scales; eye small with rounded pupil; head-shields large but more or less separated from one another by small scales; loreal region covered with small scales. Body cylindrical; scales strongly keeled in from 35 to 39 rows; ventrals very narrow, bicarinate.

Monotype *Erpeton tentaculatus*

Erpeton tentaculatum.

Erpeton tentaculatus Lacepède, Bull. Sc. Soc. Philom., II. 1800, p. 169.

Herepton tentaculatum, Boulenger, Cat. Sn. Brit. Mus., III, p. 25 (1896); Annandale, Journ. N.H.S. Siam, II, 1916, p. 91 (Singgora); Kloss, Journ. F. M. S. Mus., X, 1921, p. 201.

Rostral separated from the nasal by small scales; nasals in contact with one another or separated; prefrontals broken into small anterior and large posterior portions with an azygous shield in the middle; frontal shorter than its distance from the end of the snout, shorter than the parietals, separated from the supraoculars by small scales. 13 to 15 supralabials, separated from the eye by a series of suboculars; 17 to 19 infralabials anterior sublinguals present or absent, no posterior pair; temporal scales small, not differentiated from ordinary scales, strongly keeled.

Scales in from 35 to 39 rows, all strongly keeled; anal divided; ventrals small, 109 to 136, about twice as broad as the adjacent dorsal scales, bicarinate. Rostral appendage as long, or nearly as long as its distance from the eye.

Above reddish-brown, with a pair of ill-defined dark longitudinal stripes, one on either side of the vertebral line or joined together to form a single broad one, and with or without short cross-bars anteriorly. A broad, dark lateral stripe, starting from the snout and passing through the eye, divided on the body into an upper and lower portion by a light interval. Below yellowish-brown, with a dark stripe on either side of the ventral shields and usually a series of dark light-edged spots along the outer margin.

Total length 770 mm.; tail 195 mm.

Range. The northern part of the Malay Peninsula, Siam, Cochin China. Specimens were obtained by Annandale in the Inland Sea, Singgora.

Subfamily BOIGINAE.

Dipsadomorphinae, p. 167.

Genus **Boiga**

Dipsadomorphus, p. 167.

Boiga Fitzinger, Neue Classif. Rept., pp. 29, 31 (1826); Stejneger, Herpet, Japan, p. 381 (1907).

The occurrence of *Boiga multimaculata* and *B. gokool* in the Malay Peninsula rest upon Cantor's records, and as they have not been obtained there since, his statement may be regarded as incorrect. *B. multimaculata* is widely distributed over the Indo-Chinese peninsula but I have not seen any specimens south of Bangkok—Lat. 13′ 5° N. For remarks on the known distribution of *B. gokool*, see Wall in Journ. Bombay N.H.S., XXIX, 1924, p. 871. *B. cyanea* is here included in the fauna of the Peninsula as it has been found on Koh Pa-ngan (I. of Pennan), south of the Isthmus of Kra.

Colonel Wall has recently (Journ. Bombay Nat. Hist. Soc. XXIX, 1924, pp. 869 – 874) subdivided the genus *Boiga* into *Boiga* and *Dipsadomorphus*, retaining the former name for the species that have three enlarged grooved teeth behind the diastema and the latter for those that have only two.[*] The character however does not appear to be constant, for in 5 skulls of *B. cynodon* in my collection 2 specimens have 2 grooved teeth and the remainder have 3.

KEY TO THE SPECIES

Scales in 19 rows	*drapiezii.*
Scales in 21 rows; subcaudals 243 – 256; colour reddish or brownish with light and dark markings	*jaspidea.*
Scales in 21 rows; subcaudals 140 – 154; body reddish or brownish, uniform or with darker markings, head blackish	*nigriceps.*
Scales in 21 rows; subcaudals 124 – 133; colour uniform green	*cyanea.*
Scales in 21 (rarely 23) rows; subcaudals 89 – 110; colour black with white (yellow) cross-bars	*dendrophila.*
Scales in 23 (rarely 25) rows; subcaudals 114 – 159; colour brownish with dark spots or cross-bars or blackish with light cross-bars	*cynodon.*

Boiga drapiezii.

Dipsadomorphus drapiezii, Boulenger, p. 171.

Boiga drapiezii, Sworder, S'pore. Nat., No. 2, 1922, p. 66 (Singapore)

Boiga jaspidea.

Dipsadomorphus jaspideus, Boulenger, p. 170.

Boiga jaspidea, Sworder, S'pore. Nat., No. 2, 1922, p. 66 (Singapore).

Boiga nigriceps.

Dipsadomorphus nigriceps, Boulenger, p. 171.

Boiga cyanea.

Triglyphodon cyaneum Dum. & Bib., VII. p. 1079 (1854).

Dipsadomorphus cyaneus, Boulenger, Cat. Sn. Brit. Mus., III. p. 72 (1896).

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[*] *Fide litt.*

Anterior palatine teeth scarcely larger than the posterior; anterior mandibular teeth considerably larger than the posterior. Rostral broader than high, visible from above; internasals shorter than the prefrontals; frontal slightly longer than broad, as long as its distance from the end of the snout, shorter than the parietals; 1 preocular, extending to the upper surface of the head, rarely in contact with the frontal; 2 postoculars; temporals 2+3 or 3+3; 8 supralabials, the third, fourth and fifth touching the eye; 4 or 5 infralabials in contact with the anterior pair of sublinguals which are about as long as the posterior pair. Scales in 21 rows, the vertebral row rather strongly enlarged. Ventrals 237 – 256; anal entire; subcaudals 124 – 133.

Verdant green above, the interstitial skin black; greenish, yellowish or whitish below. Inside of mouth black, tongue purplish.

Total length 1,600 mm.; tail 320 mm.

From the Eastern Himalayas to eastern Siam and the Malay Peninsula. I obtained two specimens on Koh Pa-ngan (I. of Pennan) in the Gulf of Siam, Lat. 9′ 50° N.

Of sluggish habits, this snake makes no attempt to escape when handled, but opens its mouth widely and remains on the defensive. With its green head, large golden-brown eyes and black inside to its mouth it presents a strange sight. A specimen which I kept in captivity ate in succession one *Oligodon taeniatus*, two *Agkistrodon rhodostoma* (juveniles) and two *Trimeresurus gramineus*. The last viper was fully grown and there must have been a long struggle in the cage as everything was completely flattened down.

Boiga dendrophila.

Dipsadomorphus dendrophilus, Boulenger, p. 169; M. A. Smith, Journ. N.H.S. Siam, II, 1916, p. 162 (P. Siam).

Boiga dendrophila, Sworder, S'pore. Nat. No. 2, 1922, p. 66. (Singapore).

Very common according to Sworder on Singapore Island. The species has been met with as far north as Nakon Sritamarat (P. Siam), where I obtained it in the mountains at an altitude of 2,000 feet. One specimen had eaten a large *Agkistrodon rhodostoma*. An example captured at Bangnara, Patani, had eaten a *Chrysopelea ornata*, 4 inches longer than itself.

Boiga cynodon.

Dipsadomorphus cynodon, Boulenger, p. 172; M. A. Smith, Journ N.H.S. Siam, II, 1916, p. 162 (Patani).

Boiga cynodon, Sworder, S'pore. Nat., No. 2, 1922, p. 67 and No. 3, 1924, p. 22 (Singapore).

An aberrant example of this snake was captured at Changi, Singapore Island recently. It has only 21 scale-rows and the preoculars are narrowly in contact with the frontal. Ventrals 287, subcaudals 148. It is a male.

Genus **Psammodynastes**

Psammodynastes pulverulentus.

Boulenger, p. 173; M. A. Smith, Journ. N.H.S. Siam, II. 1916, p. 162 (P. Siam) and Journ. F. M. S. Mus., X, 1922, p. 267 (Gunong Tahan).

I have examined specimens from Bangnara, Patani, and the Nakon Sritamarat Mountains.

Psammodynastes pictus.

Boulenger, p. 174; Sworder, S'pore. Nat. No. 2, 1922, p. 67 (Singapore).

Genus **Passerita**

Dryophis, p. 174.

Passerita, Gray, Ann. Philos. (n.s.) vol. X, 1825, p. 208; Stejneger, Meddel. Zool. Mus., Kristiania, no. 2, 1914, p. 5.

According to Stejneger *Dryophis* Dalman was not published until 1827 and is therefore antedated by *Passerita* Gray of 1825.

Passerita prasina.

Dryophis prasinus, Boulenger, p. 175.

Passerita prasina, Sworder, S'pore. Nat., No. 2, 1922. p. 67, (Singapore).

Passerita xanthozonia.

Dryophis xanthozonius Boie, Isis, 1827, p. 545.

Dryophis xanthozona, Boulenger, p. 175.

Robinson and Kloss obtained this snake at Tasan, Isthmus of Kra. It has not been met with further north.

Genus **Dryophiops**

Dryophiops rubescens.

Boulenger, p. 176; Smedley, Malayan Nat., II, 1, p. 47.

Smedley records three specimens from Changi, Singapore. The range of the species extends to Java. Taylor records this species from the Philippine Islands (Philip. Journ. Sc., 1925, p. 110).

Genus **Chrysopelea**

Chrysopelea ornata.

Boulenger, p. 177; M. A. Smith, Journ. N.H.S. Siam, II, 1916, p. 163 (Patani); Sworder, S'pore. Nat., No. 2, 1922, p. 67.

A specimen from Bangnara, Patani, was found in the stomach of a *Boiga dendrophila*.

Chrysopelea pelias.

Chrysopelea chrysochlora, Boulenger, p. 178.

Chrysopelea pelias, Anderson, Kungl. Sv. Vet-akad. Handl., Stockholm, Bd. 24, no. 6, 1899, p. 35; Sworder, S'pore. Nat., no. 2, 1922, p. 67 (Singapore).

Andersson in his Catalogue of the Linnean type-specimens of snakes identifies *Coluber pelias* Linn. as the species generally recognized as *Chrysopelea chrysochlora*.

Subfamily ELAPINAE

Genus **Bungarus**

Bungarus fasciatus.

Boulenger, p. 198; M. A. Smith, Journ. N.H S. Siam, II. 1916, p. 163; Sworder, S'pore. Nat., No. 3, 1924, pp. 19 and 22 (Singapore).

A specimen of this snake was recently killed near Singapore town by Surgeon-Commander Buddle. It is the third example from the Island.

Bungarus candidus, Boulenger, p. 199.

The statement that *B. candidus* "bears a deceptive similarity in form and coloration to the harmless *Lycodon aulicus*" is not correct so far as the Malayan form of *L. aulicus* is concerned. The coloration of *L. aulicus* as given by Boulenger is consistent as regards all specimens found in the Malay Peninsula and Archipelago, and it is no doubt the resemblance of the Indian form of *L. aulicus* to *B. candidus* which has originated the statement. See also remarks by me on colour-forms of *L. aulicus* in P.Z.S., 1927, p. 221.

Bungarus flaviceps, Boulenger, p. 200.

I have examined a specimen killed in the Nakon Sritamarat mountains at 2000 feet altitude.

Genus **Naja**

Naia, p. 200.

Naja, Laurenti, Syn. Rept., p. 90 (1768).

Naja naja.

Naia tripudians, Boulenger, p. 201.

Coluber naja, Linnaeus, Syst. Nat. Ed. X, p. 221 (1758).

Naja naja, Sworder, S'pore. Nat., No. 2, 1922, p. 71 (Singapore).

We are still in need of a comprehensive survey of the various races of the common Asiatic cobra. Wall has named the Malay Peninsular form, *N. n. sputatrix* (Boie, Isis, 1827. p. 556). Journ. Bombay N.H.S.. XXX. 1925, p. 243).

Naja hannah.

Hamadryas hannah, Cantor, Asiat. Res., XIX, p. 87, pls. X—XII (1836).

Naja bungarus, Boulenger, p. 202.

Naja hannah, Sworder, S'pore. Nat., No. 2, 1922, p. 72 (Singapore). Aagaard, Journ. N.H.S. Siam, VI. 1924, p. 315.

Mr. Aagaard records a specimen of this snake killed at Nakon Sritamarat, Peninsular Siam, which was 18′ 4″ in length.

Genus **Calliophis**

Callophis, p. 203.

Calliophis Gray, Illus. Ind. Zool. II. pl. 86, figs 1—3 (1834).

Calliophis gracilis.

Callophis gracilis, Boulenger, p. 203; Sworder, S'pore Nat. no. 2, 1922, p. 72 (Singapore).

Calliophis maculiceps.

Callophis maculiceps, Boulenger, p. 204.

I have examined a specimen from Khao Ronpibun, in the Nakon Sritamarat mountains. Its colour in life was as follows:—Above chestnut red, below bright coral red; tail below pale blue. Head and nape black, with elongated reddish patches on the parietal regions. A distant series of small black spots down the back and two black bars on the tail.

Genus **Maticora**

Doliophis, p. 204.

Maticora Gray, Illus. Ind. Zool. II. p. 86, figs. 4—5 (1834); Stejneger, Meddel. Zool. Mus., Kristiania, No. 2. 1914, p. 7.

Maticora bivirgata.

Doliophis bivirgatus, Boulenger, p. 205.

Maticora bivirgata, Sworder, S'pore. Nat., No. 2. 1922, p. 72 (Singapore).

Boulenger records this species from Burma and Cochin-China. I do not know his authority for this statement nor do I know of any specimens to back it up. I have examined an example from Bangnara, Patani, and another was seen by Mr. W. A. Graham in the rest house at Singgora.* North of this locality I do not know of any authentic record.

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*Mr. Graham's description fits this snake so exactly that I have no doubt as to the identification.

Maticora intestinalis.

Doliophis intestinalis, Boulenger, p. 206; M. A. Smith, Journ. N.H.S. Siam, II. 1916, p. 163 (Nakon Sritamarat) and Journ. F. M. S. Mus., X. 1922, p. 267 (Pahang).

Maticora intestinalis, Sworder, S'pore. Nat., No. 2. 1922, p. 72 (Singapore).

The range of this species appears to be much the same as that of the preceding. I have examined a half-eaten specimen from the Nakon Sritamarat Mountains (? var *trilineatus*) but do not know of any authentic records north of this locality.

Family **Hydrophiidæ**

A complete review of this group will be found in my recent Monograph of the Sea Snakes (Brit. Mus. publication, 1926). Two species are added to the fauna of the peninsula and there are many changes in generic and specific nomenclature. The large collections of sea snakes made by the F. M. S. Museums in the Straits of Malacca and by my own collectors in the gulf of Siam have shewn that the variation of many of the species is much greater than that given by Boulenger; these forms therefore have been redescribed.

KEY TO THE GENERA

I. Maxillary bone extending forwards beyond the palatine; ventrals large, at least half as broad as the body.

 A. Nostrils lateral; nasals separated by the internasals … … *Laticauda*.

 B. Nostrils superior; nasals shields in contact with one another … *Aipysurus*.

II. Maxillary bone not extending forwards beyond the palatine (except in *Kerilia* and *Microcephalus*); ventrals small, not more than one-quarter the breadth of the body, or absent.

 A. Ventrals small but distinct throughout and normally entire.

  a. Head shields regular; nasal shields in contact with one another.

19 to 23 scales round the thickest part of the body *Kerilia*.

More than 30 scales round the thickest part of the body.
1. Mental shield normal; ventrals broad anteriorly, narrow posteriorly; 5 maxillary teeth* ... ... *Thalassophina.*
2. Mental elongate, partly hidden in a groove in the symphysis; 3 to 5 maxillary teeth* ... ... *Enhydrina.*
3. Mental normal; ventrals uniform; 5 – 18 maxillary teeth* ... ... *Hydrophis.*
b. Head shields broken up; a pair of internasals ... ... *Kolpophis.*
B. Ventrals except quite anteriorly divided by a median longitudinal fissure, vestigial (smaller than the adjacent dorsal scales), or absent.
Ventrals vestigial or absent; dorsal scales juxtaposed, the lower 3 or 4 rows larger than the others; 3 to 6 maxillary teeth;* head large ... *Lapemis.*
Ventrals in two halves; dorsal scales pointed, very strongly imbricate; 6 or 7 maxillary teeth;* head large ... ... *Astrotia.*
Ventrals when distinct, with a median fissure; dorsal scales juxtaposed, more or less quadrangular in shape; 8 to 10 maxillary teeth;* head large ... ... *Pelamis.*
Ventrals divided by a fissure; dorsal scales juxtaposed; 5 or 6 maxillary teeth;* head very small ... ... *Microcephalophis.*

Sub-family **Laticaudinae**

M. A. Smith, Monogr. Sea Sn., 1926, p. x.

Genus **Laticauda**

Platurus, p. 196.

Laticauda Laurenti, Syn. Rept. 1768, p. 109; M. A. Smith, Monogr. Sea Sn., 1926, p. 3.

The members of this family are partly terrestrial in their habits, and one of them, namely *L. colubrina,* has distinct scansorial powers. *Laticauda laticaudata* has been recorded from Achin, Sumatra; it can be distinguished from *L. colubrina* by having only 19 scale-rows.

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*Excluding the poison-fangs.

Laticauda colubrina.

Platurus colubrinus, Boulenger, p. 197.

Laticauda colubrina, Smedley and Kloss, J. Malay. Br. R. Asiatic Soc., IV, 1926, p. 163; M. A. Smith, Monogr. Sea Sn., 1926, p. 6.

The azygous shield between the prefrontal is sometimes absent.

Genus **Aipysurus**

Aipysurus eydouxi.

Boulenger, p. 195; M. A. Smith, Monogr. Sea Sn., 1926, p. 14, fig. skull.

The prefrontals may be divided to form four in a transverse series.

Three specimens of this snake have recently been acquired by the British Museum from the coast of Queensland.

Sub-family **Hydrophiinae**

M. A. Smith, Monogr. Sea Sn., 1926, p. x.

Genus **Kerilia**

Hydrophis (part), p. 186.

Kerilia Gray, Cat. Sn. Brit. Mus., p. 57 (1849); M. A. Smith, Monogr. Sea Sn., 1926, p. 31.

Maxillary bone longer than the ectopterygoid, extending forwards beyond the palatine; poison-fangs moderate, followed without any, or scarcely any, interval by from 7 to 9 teeth. Snout declivous and much narrowed anteriorly; nostrils superior, nasals in contact with one another; prefrontals small, not normally in contact with the supralabials; body robust, elongate, scales in regular rows; ventrals distinct throughout, not much broader than the adjacent scales.

The form found on the west coast of the Peninsula (*forma typica*) differs slightly from that found on the east coast.

19 – 21 scale-rows on the body; 3 infralabials touching the sublinguals; 30 – 38 dorsal bars ... ... *forma typica.*
21 – 23 scale-rows on the body 4 infralabials touching the sublinguals; 38 – 50 dorsal bars ... ... *K. j. siamensis.*

Kerilia jerdoni.

Hydrophis jerdoni, Boulenger, p. 186.

Kerilia jerdoni, M. A. Smith, Monogr. Sea Sn., 1926, p. 31., fig. skull.

Head short, snout declivous and much narrowed anteriorly; diameter of the eye equal to its distance from the mouth; rostral as high as broad; prefrontals small, usually not in contact with the supralabials; frontal much longer than broad, nearly as long as its distance from the end of the snout; 1 pre- and 1 postocular; 6 supralabials, the last often confluent with the single anterior temporal, the third and fourth touching the eye; 7 or 8 infralabials the first 3 in contact with the sublinguals, both pairs of which are well developed and in contact with one another.

17 scale-rows on the neck, 21, rarely 19, at mid-body; the scales broader than long, imbricate throughout and strongly keeled; ventrals 212 to 253, distinct throughout, a little broader than the adjacent scales.

Olive above, yellowish or white beneath, with from 30 to 38 black dorsal spots or rhombs which extend round the body to form complete bands in the young; intermediate dorsal spots or bars are usually present.

Total length 940 mm.; tail 100 mm.

Range. The east coast of the Indian Peninsula, Ceylon, the Mergui Archipelago, and the Straits of Malacca (Penang).

Kerilia jerdoni siamensis.

M. A. Smith, Monogr. Sea Sn., 1926, p. 32.

Differs from the typical form in having more scale-rows round the middle of the body (21 to 23), in having more dorsal bars or bands (38 to 50) round the body, with rarely intermediate spots.

Range. The east coast of the Malay Peninsula, Bay of Patani and Singgora, and the coast of Borneo.

Genus **Thalassophina**

Distira (part), Boulenger, Cat. Sn. Brit. Mus., p. 298 (1896).
Thalassophina, M. A. Smith, Monogr. Sea Sn., 1926, p. 33.

Maxillary bone longer than the lower aspect of the ectopterygoid, not extending as far forwards as the palatine; poison-fangs followed after an interval by 5 teeth; palatine strongly curved outwards; parietals broad, with strongly developed lateral wings, no median crest above; squamosal scarcely projecting beyond the posterior extremity of the cranium. Nostrils superior; nasal shields in contact with one another; head-shields large, regular. Body elongate, the scales on the posterior part more or less hexagonal in shape and juxtaposed; ventrals very broad anteriorly, narrow posteriorly.

One species only.

Thalassophina viperina.

Thalassophis viperina Schmidt, Abh. Naturw. Ver. Hamburg, ii, 1852, pt. 2, p. 79, pl. 3.
Hydrophis viperinus, M. A. Smith, Journ. F. M. S. Mus., X, 1920, p. 27.
Thalassophina viperina, Monogr. Sea Sn., 1926, p. 33, fig. skull.

Head short, depressed, distinct from neck, snout broadly rounded; diameter of the eye about equal to its distance from the mouth; nasal shields subtriangular, as broad as long; prefrontals much broader than long, not in contact with the labials; frontal about as broad as long, twice as broad as the supraocular; 1 rarely 2, pre- and one or two postoculars; 7 to 9 supralabials, the third to the fifth, or only 2 of them, touching the eye; temporals variable, usually a single anterior shield, but sometimes 2 or 3; 4 infralabials in contact with the sublinguals; posterior pair usually larger than the anterior and in contact with one another.

27 to 34 scale-rows on the neck, 37 to 50 on the body; ventrals (181) 226 to 274, the anterior ones half the breadth of the body, narrowing gradually until the posterior are not twice as broad as the adjacent scales; pre-anal shields considerably enlarged.

Three colour forms can be distinguished; they bear no relation to geographical areas.

1. Grey above, white below, the two colours meeting on the flank in a fairly clear line of demarcation. A common form.
2. Dorsum grey with dark rhomboidal spots or bars (25 to 35 in number) usually more or less confluent. A common form (*forma typica*).
3. Completely banded. A rare form.

Total length ♂, 925 mm.; tail 100 mm.
♀, 820 mm.; tail 80 mm.

Range. From the Persian Gulf to southern China and the Malay Archipelago. It has been obtained in the Peninsula in the Bay of Patani.

An aberrant example with only 181 ventral shields has been recorded by me (l.c.s. 1920).

Genus **Enhydrina**

Boulenger, p. 193; M. A. Smith, Monogr. Sea Sn., 1926, p. 36.

Enhydrina schistosa.

Enhydrina valakadien, Boulenger, p. 193.
Hydrophis schistosus Daudin, Hist. Nat. Rept., VII, 1803, p. 386.
Enhydrina schistosa, M. A. Smith, Monogr. Sea Sn., 1926, p. 36.

Diameter of the eye about equal to its distance from the mouth. Rostral higher than broad; prefrontals much narrowed anteriorly; frontal small, shorter than its distance from the end of the snout; 1 pre- and 1, sometimes 2, postoculars; 7 or 8 supralabials, the third and fourth, or fourth only, touching the eye, the last 2 or 3 very small; usually a single anterior temporal; mental narrow, elongate, partly hidden in a groove in the symphysis; 5 infralabials in contact with the sublinguals which are poorly developed and separated by scales.

40 to 52 scale-rows on the neck in males, 42 to 55 in females, 49 to 60 on the body in males, 51 to 66 in females, the

scales imbricate or subimbricate, with a short central keel; ventrals 239 to 322, distinct throughout, a little broader than the adjacent scales; preanals feebly enlarged.

Young grey or bluish-grey above, whitish below, with dark grey or black annuli broadest dorsally; these markings usually disappear in the adult, leaving the back of a uniform greyish colour.

Total length 1,400 mm.; tail 180 mm.

Range. From the Persian Gulf to the coast of Cochin-China and the north coast of Australia. The commonest sea-snake known.

Examination of good series from the seas west of the Peninsula shows that the prefrontal usually touches the second labial and the third and fourth labials usually touch the eye (75 per cent), whereas in the form east of the Peninsula the prefrontal usually fails to touch the labial and the fourth labial only touches the eye (70 per cent).

Genus **Hydrophis**

Hydrophis (part), p. 181.

M. A. Smith, Monogr. Sea Sn., 1926, p. 40.

Maxillary bone not extending forwards beyond the palatine; poison-fangs followed after an interval by from (1) 5 to 18 teeth; palatine straight or feebly curved. Nostrils superior, nasal shields in contact with one another; head-shields large, regular; body scales imbricate, subimbricate or juxtaposed; ventrals small, distinct throughout and normally entire.

KEY TO THE SPECIES

I. Scales on the thickest part of the body with rounded or bluntly pointed tips, distinctly or feebly imbricate; 5 to 8 maxillary teeth behind the poison-fangs.

a. 6 to 8 supralabials; head not small, body not long and slender anteriorly.

1 anterior temporal; scales 25 – 31/33 – 38 (4 – 8); body with black bands much narrower than their interspaces ... ... *spiralis*.

1 anterior temporal; scales 25 – 29/37 – 41 (10 – 14);* body with black bands much broader than their interspaces ... ... *melanosoma*.

2 anterior temporals; scales 29 – 35/37 – 47 (8 – 12); body with black bands broader above than below or dorsal bars only ... *cyanocinctus*.

b. 5 (rarely 6) supralabials; head small, body long and slender anteriorly.

1 anterior temporal; scales 23 – 25/33 – 37; body with black bands broadest dorsally ... *klossi*.

II. Scales on the thickest part of the body more or less hexagonal or quadrangular in shape, feebly imbricate or juxtaposed; 8 to 18 maxillary teeth behind the poison-fangs.

A. 8 to 13 maxillary teeth.

1 anterior temporal; ventrals 242 to 306; head in the adult pale grey with a suffusion of yellow above ... ... *torquatus*.

1 anterior temporal; ventrals 276 to 325; head in the adult blackish to dark olive with yellow markings across the snout and along the sides ... ... *t. aagaardi*.

2 anterior temporals; head in the adult olivaceous *ornatus*.

B. 14 to 18 maxillary teeth behind the poison-fangs.

2 anterior temporals ... ... *caerulescens*.

III. Scales on the thickest part of the body more or less hexagonal or quadrangular in shape, feebly imbricate or juxtaposed; 5 or 6 maxillary teeth behind the poison-fangs.

Scales 28 – 33/49 – 58; ventrals 414 – 514; head black ... ... *fasciatus*.

Scales 25 – 30/39 – 49; ventrals 323 – 452; head black ... ... *f. atriceps*.

Scales 25 – 31/37 – 45; ventrals 328 – 414; head with yellow markings ... ... *brookii*.

Hydrophis spiralis.

Hydrophis brugmansi, Boulenger, p. 184; M. A. Smith, Journ. F. M. S. Mus., X, 1920, p. 12.

Hydrophis spiralis Shaw., Gen. Zool., III, p. 564, pl. (1802); M. A Smith, Monogr. Sea Sn., 1926, p. 48.

Maxillary teeth behind the poison-fangs 6 or 7. Head moderate; body elongate, not slender anteriorly, its greatest diameter posteriorly being twice, or a little more, that of the neck. Diameter of the eye in the adult less than its distance from the mouth; frontal as long as its distance from the rostral or the end of the snout; 1 pre- and 1 rarely 2, postoculars; a single large anterior temporal often descending to the labial margin; 6 to 8 supralabials, the second in contact with the prefrontal, the third, fourth, and fifth, or only two of them, touching the eye; 4 infralabials in contact with the sublinguals, both pairs of which are well developed and in contact with one another; usually a small scale at the oral margin after the third or fourth infralabial.

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*Represents the number of scale-rows on the neck and body, and the increase in the number of scale-rows from neck to body.

25 to 31 scale-rows on the neck, 33 to 38 on the thickest part of the body (increase 4 to 8), the scales feebly imbricate throughout, smooth or with a small central tubercle or short keel. Ventrals 295 to 362, distinct throughout, twice as broad as long as the adjacent scales; preanals considerably enlarged.

Yellowish or yellowish-green, the dorsal scales with black margins and with more or less complete narrow black annuli, much narrower than their interspaces (2½ to 3 times), and feebly dilated vertebrally. Dorsal spots often present between the bands; in the young a black ventral line may be present. Head in the young blackish, with a yellow horseshoe-shaped mark above; in the adult usually entirely yellow.

Total length, ♂, 1620 mm.; tail 140 mm.

Total length, ♀, 1830 mm.; tail 120 mm.

Wall records a female from Madras measuring 2500 mm. in total length (Journ. Bombay N.H.S. XX, 1911, p. 858) and another from Penang measuring 2745 mm. (Journ. Bombay N.H.S., XXII, 1913, p. 404). Such large specimens are unusual.

Range. From the Persian Gulf to the Malay Peninsula and Archipelago. Recorded in the Peninsula only from Penang and Singapore.

Hydrophis melanosoma.

Hydrophis wrayi, Boulenger, p. 185.

Hydrophis melanosoma Günther, Rept. Ind., p. 367, fig., (1864); M. A. Smith, Journ. F. M. S. Mus., X, 1920, p. 10 and Monogr Sea Sn., 1926, p. 51.

Maxillary teeth behind the poison-fangs 5 or 6. Head moderate, body not slender anteriorly, compressed posteriorly, its greatest diameter being from 2 to nearly 3 times that of the neck. Diameter of the eye in the adult less than its distance from the mouth; frontal usually shorter than its distance from the rostral; 1 pre- and 1 postocular; a single large anterior temporal; 6 or 7 supralabials, the second in contact with the prefrontal, the third and fourth touching the eye, the last 1 or 2 very small; 4 infralabials in contact with the sublinguals, both pairs of which are usually well developed; usually a series of small scales at the oral margin after the second or third infralabial.

25 to 29 scale-rows on the neck, 37 to 41 on the body (increase 10 to 14), the scales imbricate throughout, with a strong keel in adult males. Ventrals 266 to 368, bicarinate, not twice as broad as the adjacent scales; preanals much enlarged.

Greenish-yellow, the dorsal scales with black margins and with 50 to 70 broad black bands, usually as broad above as below, and about twice as broad as their interspaces; rarely they taper ventrally and may be incomplete below. Head black, uniform or with a yellowish mottling which is usually confined to the snout.

Total length, 1550 mm.; tail 160 mm.

Range. The Straits of Malacca, the coast of Borneo, and Macassar. Not uncommon on the coast of Perak, whence have come nearly all the speciments that are known.

Hydrophis cyanocinctus.

Boulenger, p. 185; M. A. Smith, Journ. F. M. S. Mus., X, 1920, p. 8 and Monogr. Sea Sn., 1926, p. 56, fig. skull.

Maxillary teeth behind the poison-fangs 5 to 8. Head moderate, body elongate, not slender anteriorly, compressed posteriorly, its greatest diameter in the adult being from 2 to 2½ times that of the neck. Diameter of the eye in the adult less than its distance from the mouth; frontal usually as long as its distance from the rostral or the end of the snout; 1 pre- and 2 postoculars; normally 2 superposed anterior temporals; 7 or 8 supralabials, the second in contact with the prefrontal, the third, fourth, and fifth, or only 2 of them touching the eye; 4 infralabials in contact with the sublinguals, both pairs of which are well developed and in contact with one another or the posterior pair separated by scales; a series of small scales at the oral margin after the second or third infralabial.

27 to 35 scale-rows on the neck, 37 to 47 on the thickest part of the body (increase 8 to 14), the scales imbricate throughout, usually with a central keel, which may be broken into a series of 2 or 3 tubercles, rarely quite smooth; ventrals 290 to 390, distinct throughout, anteriorly about twice as broad as the adjacent dorsal scales, posteriorly a little less; preanals much enlarged.

Total length, 1885 mm.; tail 135 mm.

Olivaceous or yellowish with more or less distinct black annuli, broadest or best marked above or with black dorsal bars only. Very young specimens usually have a black band running along the belly.

Range. From the Persian Gulf to Japan and the seas of the Malay Archipelago.

A common species in the Straits of Malacca.

Hydrophis klossi.

Hydrophis klossi, Boulenger, p. 190; M. A. Smith, J. Bombay N.H.S., XXIII, 1915, p. 787 and Journ. F. M. S. Mus., X, 1920, p. 19, fig. and Monogr. Sea Sn., 1926, p. 68, fig. skull.

Hydrophis nigrocinctus, Laidlaw, P.Z.S., 1901, p. 579; (part.) Boulenger, p. 187.

Maxillary teeth behind the poison-fangs 5 or 6. Head small, body long and slender anteriorly, compressed posteriorly, its greatest diameter being from two or three times that of the neck; snout somewhat projecting; diameter of the eye equal to or slightly less than its distance from the mouth. Frontal small, shorter than its distance from the end of the snout; 1 pre- and 1 postocular; 1 large anterior temporal; 5, rarely 6, supralabials, the second in contact with the prefrontal, the third and fourth touching the eye, the sixth when present very small; 4 infralabials in contact with the sublinguals, both pairs of which are well developed, the posterior pair usually separated by one or two scales.

23 to 25 (27), scale-rows on the neck, 31 to 37 (39) on the body (increase 8 to 12), the scales imbricate throughout and smooth or feebly keeled. Ventrals distinct throughout, 360 to 413, not twice as broad as the adjacent dorsal scales; preanals much enlarged.

Greyish or greenish above, greenish or yellowish below, with from 50 to 75 dark bands broadest dorsally and broader than their interspaces; sometimes a black ventral line, or the neck and forebody below may be entirely black. Head blackish to olivaceous, sometimes with an indistinct horseshoe shaped mark above. In the young the markings are more clearly defined.

Total length, 1300 mm.; tail 110 mm.

Range. The Straits of Malacca and the western side of the Gulf of Siam as far south as Patani.

HYDROPHIS TORQUATUS.

Two forms, each with a very limited range, inhabit the seas of the Peninsula. They may be distinguished as follows:—

33 to 37 scale-rows on the neck, 43 to 49 on the body; ventrals 242 to 306 (av. 278). Head in the adult pale grey with a suffusion of yellow above. Straits of Malacca ... *forma typica.*

31 to 37 scale-rows on the neck, 39 to 47 on the body; ventrals 276 to 325 (av. 297). Head in the adult blackish to dark olive with yellow markings across the snout and along the sides. E. coast of Malay Peninsula and Borneo ... ... *H. t. aagaardi.*

Hydrophis torquatus *forma typica.*

Boulenger, p. 190; M. A. Smith, Journ. F. M. S. Mus. X, 1920, p. 12 and Monogr. Sea Sn., 1926, p. 76.

Maxillary teeth behind the poison-fangs 8 to 10. Head moderate, body elongate, not very slender anteriorly, compressed posteriorly, its greatest diameter being from 2 to 3 times that of the neck. Diameter of the eye equal to its distance from the mouth; frontal shorter than its distance from the rostral; 1 pre- and 1 or 2 postoculars; a single anterior temporal; 7, sometimes 8, supralabials, the second in contact with the prefrontal, the third and fourth touching the eye, the last 2 or 3 very small; 4 infralabials in contact with the sublinguals, both pairs of which are well developed and in contact with one another, or the posterior pair separated by scales.

33 to 37 scale-rows on the neck, 41 to 49, usually 43 to 47, on the body, the posterior scales more or less hexagonal in shape, subimbricate, and with a central tubercle or short keel. Ventrals 242 to 306, distinct throughout, not twice as broad as the adjacent dorsal scales; preanals considerably enlarged.

Colour varies considerably with age. The young are whitish, with from 46 to 63 well-defined black bands, which are often incomplete ventrally; the head is black, with a whitish or yellowish mark across the snout and along the sides. Adults are pale grey above, yellowish-white below, with dark grey bands, less clearly defined and usually incomplete ventrally in the posterior part of the body. In some aged individuals the bands have almost entirely disappeared, leaving the back more or less uniform grey; the head is grey, with the yellow markings more extensive and less defined, this colour sometimes covering the whole of the top of the head except a small patch of the crown.

Total length, ♂ 835 mm.; tail 80 mm.
,, ,, ♀ 785 mm.; tail 70 mm.

Range. The Straits of Malacca. A common snake on the coasts of Perak and Selangor. It has not been met with north of Penang or south of latitude 2° N.

Hydrophis torquatus aagaardi.

M. A. Smith, Journ. F. M. S. Mus., X, 1920, p. 149 and Monogr. Sea Sn., 1926, p. 78.

Differs from the typical form in having fewer scale-rows and more ventrals.

Colour. Greyish or greenish-grey above, yellowish-white below, with from 55 to 68 dark grey or blackish annuli which may be incomplete ventrally. Head black to dark olive with yellow markings across the snout and along the sides of the head; sometimes yellow spots on the frontal and parietal shields. With age the markings lose definition.

Total length, ♂ 920 mm.; tail 120 mm.
,, ,, ♀ 930 mm.; tail 90 mm.

This form is common off the coast of Patani, and is frequently caught by the fishermen while trawling.

An aberrant specimen with 37 scale-rows on the neck, 51 on the body, and 292 ventral shields has been recorded by me from the coast of Patani (1920).

Hydrophis ornatus.

Hydrophis ornatus, Boulenger, p. 184; M. A. Smith, Monogr. Sea Sn., 1926, p. 81, fig. skull.

Hydrophis lamberti M. A. Smith, Journ. N.H.S. Siam, II, 1917, p. 340 and Journ. F. M. S. Mus., X, 1920, p. 6.

Maxillary teeth behind the poison-fangs 10 to 13; head large; body robust, not markedly elongate, its greatest diameter posteriorly being about twice that of the neck; diameter of the eye at least equal to its distance from the mouth. Frontal as long as its distance from the rostral or the end of the snout; 1 pre- and 2 or 3 postoculars; 7 or 8 supralabials, the second normally in contact with the prefrontal, the third and fourth touching the eye; 2 superposed anterior temporals; 4 infralabials in contact with the sublinguals, the anterior pair of which are well developed and in contact with one another, the posterior pair ill-developed and separated by scales. Usually no small scales at the oral margin between the infralabials.

31 to 37 scale-rows on the neck in males, 38 to 45 in females, 37 to 45 on the body in males, 43 to 55 in females; ventrals 227 to 260 in males, 244 to 312 in females.

Colour. Pale greyish or olivaceous, sometimes almost white, above, with broad dark bars or rhomboidal spots separated by narrow interspaces; below yellowish or whitish; head olivaceous.

Total length, ♂ 950 mm.; tail 115 mm.
,, ,, ♀ 860 mm.; tail 80 mm.

Range. From the Persian Gulf to China and the coast of New Guinea. A rare species on the coasts of the peninsula.

Hydrophis caerulescens.

Boulenger, p. 187; M. A. Smith, Monogr. Sea Sn., 1926, p. 90, fig. skull.

Maxillary teeth behind the poison-fangs 14 to 18. Head moderately small, body not very slender anteriorly, compressed posteriorly, its greatest diameter being from 2 to 3 times that of the neck. Diameter of the eye equal to or greater than its distance from the mouth; frontal usually shorter than its distance from the rostral; 1 pre- and 1, sometimes 2 postoculars; 2, sometimes 3, anterior temporals; 7 or 8 supralabials, the second in contact with the prefrontal, the third and fourth touching the eye; 4 infralabials in contact with the sublinguals, the posterior pair usually poorly developed and separated by scales. Usually a small scale at the oral margin after the third and fourth infralabials.

31 to 43 scale-rows on the neck, 38 to 54 on the body (increase 6 to 14), the posterior subimbricate and with truncated tips, all strongly keeled. Ventrals 253 to 334, distinct throughout, not twice as broad as the adjacent dorsal scales; preanals considerably enlarged.

Bluish-grey above, yellowish-white below, with from 40 to 60 broad bands, above twice as broad as their interspaces on the forepart of the body, tapering towards the belly where they may be incomplete on the thicker part of the body. With age these markings usually become indistinct and in some old individuals are scarcely recognisable, the back being almost uniform grey. Head black in the young, sometimes with a light curved mark; dark grey in the adult with or without a light streak behind the eye.

Total length, ♂ 820 mm.; tail 100 mm.
,, ,, ♀ 740 mm.; tail 65 mm.

Range. From Bombay to China and the Malay Archipelago. A common species in the seas round the peninsula.

HYDROPHIS FASCIATUS.

The typical form inhabits the Straits of Malacca and the seas further west; the form found east of Singapore and throughout the Malay Archipelago is *H. f. atriceps*:—

28 to 33 scale-rows on the neck, 49 to 58 on the body; ventrals 414 to 514 ... ... *fasciatus*.
25 to 30 scale-rows on the neck, 39 to 49 on the body; ventrals 323 to 453 ... ... *fasciatus atriceps*.

Hydrophis fasciatus.

Hydrophis fasciatus (part), Boulenger, p. 189.

Hydrophis fasciatus, M. A. Smith, Journ. F. M. S. Mus., X, 1920, p. 22 and Monogr. Sea Sn., 1926, p. 94.

Hydrophis rhombifer, Boulenger, p. 188.

Maxillary teeth behind the poison-fangs 5, sometimes 6. Head very small, body long and very slender anteriorly, much compressed posteriorly, its greatest diameter being from 2½ to 4 times that of the neck. Diameter of the eye equal to or greater than its distance from the mouth; frontal usually at least as long as its distance from the rostral; 1 pre- and 1, rarely 2 postoculars; a single large anterior temporal succeeded by another scale as large or larger; a series of from 2 to 4 small scales behind the parietals and between the posterior temporals; 6 or 7, rarely 5, supralabials, the second in contact with the prefrontal, the third and fourth touching the eye, the last 1 or 2 very small; 4 infralabials in contact with the sublinguals, both pairs of which are well developed and in contact with one another; a small scale usually present at the oral margin between the third and fourth infralabials.

28 to 33 scale-rows on the neck, 47 to 58 on the body (increase 20 to 27), the posterior subimbricate and more or less hexagonal in shape, with a central tubercle or short keel. Ventrals 414 to 514, distinct throughout, not twice as broad as the adjacent dorsal scales, bicarinate; preanals considerably enlarged.

Colour. Head, neck, and anterior part of body shiny black to dark olive with pale yellowish oval spots on the sides or connected as dorsal bars; posteriorly greyish above, whitish below, with dark dorsal rhomboidal spots which may extend down the sides of the body and from complete annuli in the young.

Total length, ♂, 1110 mm.; tail 100 mm.
,, ,, ♀, 990 mm.; tail 75 mm.

Range. The coasts of India and Burma and the Straits of Malacca.

Hydrophis fasciatus atriceps.

Hydrophis fasciatus (part), Boulenger, p. 189.
Hydrophis atriceps Günther, Rept. Brit. Ind., 1864, p. 371, fig.
Hydrophis fasciatus atriceps, M. A. Smith, Journ. F. M. S. Mus., X, 1920, p. 25 and Monogr. Sea Sn., 1926, p. 97.

Differs from the typical form in having fewer scale rows and fewer ventrals, as given in the key.

Range. From the Gulf of Siam to the Philippine Islands and the north coast of Australia. Has been obtained on the peninsular coast at Singgora.

Hydrophis brookii.

Hydrophis brookii Günther, P.Z.S. 1872, p. 597, fig.; M. A. Smith, Monogr. Sea Sn., 1926, p. 99.
Hydrophis consobrinus, M. A. Smith, Journ. N.H.S. Siam, II, 1917, p. 341 and Journ. F. M. S. Mus., X, 1920, p. 20, fig.

Maxillary teeth behind the poison-fangs 5; head very small, body long and very slender anteriorly, much compressed posteriorly, its greatest diameter being from 2½ to 3 times that of the neck. Diameter of the eye equal to or greater than its distance from the mouth; frontal as long as or shorter than its distance from the rostral; 1 pre- and 1, rarely 2, postoculars; a single large anterior temporal sometimes reaching the border of the mouth and succeeded by another large scale which may be divided in two by a vertical suture; a series of from 4 to 7 small scales behind the parietals and between the posterior temporals; 6, sometimes only 5, supralabials,

the second in contact with the prefrontal the third and fourth touching the eye, the sixth very small; 4 infralabials in contact with the sublinguals, both pairs of which are well developed and in contact with one another; a small scale usually present at the oral margin between the third and fourth infralabials.

25 to 31 scale-rows on the neck, 37 to 45 on the body (increase 9 to 16), those posterior subimbricate and more or less hexagonal in shape, usually with a central tubercle or short keel. Ventrals 328 to 414, distinct throughout, not twice as broad as the adjacent dorsal scales, bicarinate; preanals considerably enlarged.

Greyish above, yellowish white below, with from 60 to 80 dark grey bands or bars. Anteriorly these completely encircle the body, are of uniform breadth throughout, and about twice as broad as their interspaces; posteriorly they narrow on the sides of the body and may be incomplete ventrally. Head blackish or greyish, with a curved yellow mark extending across the snout and backwards along the sides of the head; often a connecting band of yellow across the frontal and another across the parietal shields. With age these markings lose definition.

Total length, ♂, 1035 mm.; tail 115 mm.
,, ,, ♀, 965 mm.; tail 75 mm.

Range. The Straits of Malacca as far north as Trang, the Gulf of Siam, the coast of Cochin China, and the north coasts of Borneo and Java.

Can be distinguished from *Hydrophis fasciatus*, and *H. f. atriceps* with which it has been confused, by the fewer scale-rows round the thickest part of the body, more small scales in a series behind the parietals, and by the colouration of the head.

Genus **Kolpophis**

Thalassophis, p. 195.

Kolpophis, M. A. Smith, Monogr. Sea Sn., 1926, p. 106.

Maxillary bone longer than the lower aspect of the ectopterygoid, not extending forwards as far as the palatine; poison-fangs followed after an interval by six or seven teeth. Nostrils superior; head-shields irregularly divided. Head large, body stout, covered with small, irregular, juxtaposed scales; ventrals small but distinct throughout.

Kolpophis annandalei.

Thalassophis annandalei, Boulenger, p. 195; M. A. Smith, Journ. F. M. S. Mus., X, 1920, p. 29.
Kolpophis annandalei, M. A. Smith, Monogr. Sea Sn., 1926, p. 106, fig. skull.

Head large, body short, stout, its greatest diameter posteriorly not more than twice that of the neck. Diameter of the eye equal to or a little less than its distance from the mouth. Rostral entire, nasal and prefrontal shields usually divided; supraocular, frontal and parietal usually entire, the two latter variable in size; parietals separated by small scales; 9 to 11 supralabials, subject to much fragmentation; temporals small and irregular; usually no distinct sublinguals; infralabials when defined usually separated from the oral margin by small scales.

62 to 82 scales round the neck, 74 to 93 round the body, those posterior more or less hexagonal in shape, subimbricate or juxtaposed, smooth, or with a short keel; ventrals distinct throughout, 320 to 368; preanals considerably enlarged.

Yellowish, with pale grey dorsal bars, 35 to 45 in number, much broader than their interspaces and tapering to a point on the sides, or with the dorsum entirely grey; below whitish; head olivaceous.

Total length 910 mm.; tail 120 mm.

Range. Malay Peninsula (Patani bay); Cochin China; Java.

Genus **Lapemis**

Enhydris, p. 193.

Lapemis Gray, Illus. Ind. Zool., II, 1835, pl. 87; M. A. Smith, Monogr. Sea Sn., 1926, p. 108, pl. 1 and text-fig. skull.

Maxillary bone longer than the lower aspect of the ectopterygoid, extending forwards as far, or nearly as far, as the palatine; poison-fangs followed after an interval by from 3 to 6 teeth; nostrils superior, nasal shields in contact with one another; head large, body stout, scales hexagonal or squarish, juxtaposed, the lowermost 3 or 4 rows larger than the others; ventrals small, usually distinct anteriorly, very small or absent posteriorly.

Only one species is definitely known to inhabit the peninsular shores.

Lapemis hardwickii.

Enhydris hardwickii, Boulenger, p. 193; M. A. Smith, J. Bombay N.H.S., XXIII, 1915, p. 787 and Journ. F. M. S. Mus., X, 1920, p. 32.

Lapemis hardwickii, M. A. Smith, Monogr. Sea Sn., 1926, p. 108, fig. skull.

Enhydris curtus, Laidlaw, P.Z.S., 1901, p. 581.

Head large, body short, stout, the diameter of the neck being half or more than half the greatest diameter of the body; diameter of the eye about equal to its distance from the mouth; frontal not longer than its distance to the rostral; prefrontal normally in contact with the second supralabial, sometimes by fission of its outer extremity a pseudo-loreal is formed; 1 pre- and 1 or 2, postoculars; 2, rarely 3, anterior temporals; 7 or 8 supralabials, the third and fourth touching the eye, the last 2 or 3 very small; 3 or 4 infralabials in contact with the sublinguals, both pairs of which are variable as regards development and usually separated by small scales.

23 to 31 scale-rows on the neck in males, 27 to 35 in females; 25 to 37 on the body in males, 33 to 41 in females; the scales hexagonal or squarish, the lowermost rows with a central tubercle or short keel which in adult males may become strongly spinose; ventrals 114 to 186 in males, 141 to 230 in females, not as large as the adjacent scales except quite anteriorly, frequently absent altogether, uni- or bituberculate; preanals feebly enlarged.

Greenish or yellowish olive above, whitish below, with from 35 to 50 pale olive to dark grey dorsal bars which taper to a point on the sides. Variations from this pattern are frequent. The dorsal bars may be continued round the body as complete bands; a narrow dark ventral stripe may be present, or less frequently a broad irregular band. Coalescence of the dorsal bars often occurs in adults, so that the entire back may be uniform in coloration. Head pale olive to black, with or without yellow markings across the snout and along the sides of the head.

Total length 860 mm.; tail 85 mm.

Range. From the Mergui Archipelago to southern Japan and the coast of north Australia. Abundant in the Straits of Malacca and on the coast of Patani.

Genus **Astrotia**

Hydrophis (part), p. 183.

Astrotia Fischer, Abh. Naturw. Ver. Hamburg., III, 1856, p. 38; M. A. Smith, Monogr. Sea Sn., 1926, p. 113.

Maxillary bone longer than the lower aspect of the ectopterygoid, not extending forwards as far as the palatine, which is curved outwards; poison-fangs followed after an interval by 6 or 7 teeth. Head-shields large, regular; nostrils superior, nasal shields in contact with one another; body stout, covered with strongly imbricate scales; ventrals completely divided in two, except quite anteriorly, the halves pointed, or with the tip dentate.

Astrotia stokesii.

Hydrophis stokesii, Boulenger, p. 183.

Astrotia stokesii, M. A. Smith, Monogr. Sea Sn., 1926, p. 113. pl. 1, fig. 2.

Genus **Pelamis**

Hydrus, p. 181.

Pelamis (part), Daudin, Hist. Nat. Rept., VI, 1803, p. 361; M. A. Smith, Monogr. Sea Sn., 1926, p. 116.

Pelamis platurus.

Hydrus platurus, Boulenger, p. 181; M. A. Smith, Journ. F. M. S. Mus., X, 1920, p. 5.

Pelamis platurus, M. A. Smith, Monogr. Sea Sn., 1926, p. 116, fig. skull.

Genus **Microcephalophis**

Hydrophis (part), p. 191.

Microcephalophis Lesson, in Belanger's Voy. Ind. Orient, p. 320 (1834); M. A. Smith, Monogr. Sea Sn., 1926, p. 120.

Maxillary bone longer than the ectopterygoid, extending forwards as far as or a little farther than the palatine, the concavity on its inner aspect very small. Poison-fangs followed after an interval by 5 to 6 teeth. Head small, head-shields large, regular; nasal shields in contact with one another; body long and slender anteriorly, the scales on its posterior part hexagonal, juxtaposed. Ventrals entire anteriorly, more or less completely divided by a longitudinal furrow posteriorly, the two halves being apposed to one another or alternating.

The genus as now restricted contains two species.

KEY TO THE SPECIES AND SUBSPECIES.

Prefrontal not touching third supralabial; 220 to 350 ventrals.
  17 to 19 scale-rows on the neck; 30 to 36 on the body ... ... *M. gracilis.*
  19 to 23 scale-rows on the neck; 35 to 43 on the body ... ... *M. g. microcephalus.*
Prefrontal touching third supralabial; 404 to 468 ventrals ... ... *M. cantoris.*

Microcephalophis gracilis.

Hydrophis gracilis (part), Boulenger, p. 191; M. A. Smith, Journ. F. M. S. Mus., X, 1920, p. 26.

Microcephalophis gracilis, M. A. Smith, Monogr. Sea Sn., 1926, p. 121, pl. 1 and text-fig. skull.

Maxillary bone extending forwards as far as or farther than the palatine. Head very small, elongate, body long and very slender anteriorly, much compressed posteriorly, its greatest diameter being 4 to 5 times that of the neck. Snout projecting beyond the lower jaw; diameter of the eye about equal to its distance from the mouth. Rostral large, extending well on to the upper surface of the snout; frontal small, usually shorter than its distance from the rostral; 1 pre- and 1 postocular; a single anterior temporal followed by another scale as large or larger; 6 supralabials, the second usually in contact with the prefrontal, the third and fourth touching the eye; 4 infralabials in contact with the sublinguals, both pairs of which are well developed and in contact with one another; no small scale at the oral margin between the infralabials.

17 to 19 scale-rows on the neck, 30 to 36 on the body (increase 12 to 16), the posterior scales hexagonal, juxtaposed, broader than long, with 2 or 3 very small tubercles one behind the other, the lowermost rows of scales a little larger than the others and with very prominent tubercles or dentate keels in adults. Ventrals 220 to 287, entire on the slender portion of the body and broader than the adjacent dorsal scales, completely divided posteriorly by a median furrow, the two halves being apposed to one another or alternating; preanals feebly enlarged.

The young are black with a series of whitish dorsal bands or oval lateral spots on the slender part of the body, and more or less complete bands posteriorly, from 40 to 60 in number. With age the markings lose definition and the adult is usually greyish above, paler below, with the bars or bands indistinctly marked, particularly on the thickest part of the body; head olivaceous to yellowish.

Total length, ♂, 950 mm.; tail 80 mm.
,, ,, ♀, 1,025 mm.; tail 95 mm.

Range. From the Persian Gulf to southern China and the coast of Australia. Replaced in the Straits of Malacca and on the north coast of Java by *M. g. microcephalus*. Specimens of *M. gracilis* have been found at Singgora and in the Bay of Patani.

Microcephalophis gracilis microcephalus.

Hydrophis gracilis (part), Boulenger, p. 191; M. A. Smith, Journ. F. M. S. Mus., X, 1920, p. 26.

Thalassophis microcephala Schmidt, Abh. Naturw. Ver. Hamburg, II, 1852, p. 78, pl. 2.

Hydrophis rostralis M. A. Smith, Journ. N.H.S. Siam, II, 1917, p. 340.

Microcephalus gracilis microcephalus, M. A. Smith, Monogr. Sea Sn., 1926, p. 123.

Differs from the typical form in having more scale-rows, 21 to 23, rarely 19, on the neck, 35 to 43 on the body (increase 14 to 29); more ventrals, 250 to 350, and in the comparatively larger head and thicker fore-body, the diameter of the neck being from $\frac{1}{3}$ to nearly $\frac{1}{2}$ the greatest diameters of the body.

Colour. Bluish grey on the upper half of the body, whitish on the lower, the two colours meeting in a fairly clear line of demarcation; dark bars or bands are feebly marked or absent; head grey, yellowing with age. Juveniles have darkish dorsal bars or complete bands; very young specimens I have not seen.

Range. The Straits of Malacca and north coast of Java.

Microcephalophis cantoris.

Hydrophis cantoris, Boulenger, p. 191.

Microcephalophis cantoris, M. A. Smith, Monogr. Sea Sn., 1926, p. 125, fig. skull.

Cantor's types, said to have come from Penang, are the only records of this species in the Malayan region.

Family **Amblycephalidae**

Genus **Aplopeltura**

Haplopeltura, p. 207.

Aplopeltura, Dum. and Bib., Mem. Ac. Sc. XXIII, p. 463 (1853)

Aplopeltura boa.

Haplopeltura boa, Boulenger, p. 208.

Two specimens were obtained by Mr. Nelson in the hills to the east of Chumporn (Isthmus of Kra) at an altitude of 1000 feet.

Genus **Amblycephalus**

One species, *A. carinatus* is added. It can be distinguished from the other species in the Peninsula by the prefrontal not touching the eye and by its keeled dorsal scales.

Amblycephalus malaccanus, Boulenger, p. 209.

Very rare in the Peninsula. I obtained a single specimen at Betong, Patani; in this example the vertebral row of scales only is distinctly enlarged. V. 155. C. 37. ♂.

Amblycephalus laevis, Boulenger, p. 209.

I obtained a specimen on Khao Ram in the Nakon Sritamarat mountains. V. 157. C. 44. It appears to be the most northerly record of the species.

Amblycephalus vertebralis, Boulenger, p. 210.

Amblycephalus moellendorffi, Boulenger, p. 210.

Very common at Bangnara, Patani, according to Mr. C. J. Aagaard.

Amblycephalus carinatus berdmorei.

Amblycephalus carinatus Boie, Isis, 1828, p. 1035; Boulenger, Cat. Sn. Brit. Mus., III, 1896, p. 445; M. A. Smith, Journ. N.H.S. Siam, II, 1916, p. 163 (P. Siam).

Pareas berdmorei (part), Theobald, Cat. Rept. Asiat. Soc. Mus., 1868, p. 63.

Amblycephalus carinatus hainanus M. A. Smith, Journ. N.H.S. Siam, VI, 1923, p. 204.

Rostral distinctly higher than broad; internasals about half the size of the prefrontals; frontal as long as broad or a little longer than broad, longer than its distance from the end of the snout, longer or shorter than the parietals; loreal higher than long; eye surrounded by from 4 to 7 shields in addition to the supraocular, viz., 1 or 2 preoculars, 2 or 3 suboculars, 1 or 2 postoculars; temporals 2+3 or 3+3; 7 or 8 supralabials, the last very long; first lower labial in contact with its fellow behind the mental; three pairs of large sublinguals, broader than long. Scales in 15 rows, the 3 dorsal rows slightly enlarged and more or less distinctly keeled, the keels sometimes hardly distinguishable. Ventrals 161 – 189; anal entire; subcaudals 68 – 100.

Yellowish or reddish-brown above, more or less finely speckled with black, and with blackish transverse spots or more or less regular cross-bars interrupted on the vertebral line; a black line on each side of the head behind the eye, confluent with an X-shaped black blotch on the nape; an oblique black line from the eye to the last supralabial; yellowish or white beneath, dotted or striolated with blackish, or with a median black line.

Total length 660 mm.; tail 135 mm.

Range. From Southern Burma to Hongkong and the northern part of the Malay Peninsula. It is common at Bangnara, Patani according to Mr. Aagaard and it has also been obtained at Klong Tun Sai and in the hills east of Chumporn. There are two specimens from Taiping and another without recorded locality, in the Taiping Museum.

As pointed out by me (1923) the form from the Asiatic mainland has more ventrals and subcaudals than the typical form which belongs to the Malay Archipelago.

Family **Viperidae**

Genus **Agkistrodon**

Ancistrodon, p. 212.

Agkistrodon Beauvois, Trans. Amer. Phil. Soc., IV, 1799, p. 381.

Agkistrodon rhodostoma.

Ancistrodon rhodostoma, Boulenger, p. 213; M. A. Smith, Journ. N.H.S. Siam, II, 1916, p. 164 (Patani).

This snake is common at Bangnara, Patani; its range extends to the extreme north of Siam.

It is oviparous. A female in my possession laid 13 eggs and guarded them until they hatched out 47 days later. (J. Bombay N.H.S. XXIII, 1915, p. 788).

Genus **Trimeresurus**

Lachesis, p. 214.

Trimeresurus Lacepede, Ann. Mus. d'Hist. Nat., Paris, IV, 1804, p. 209.

Trimeresurus and *Lachesis*, Mocquard, Bull. Mus., d'Hist. Nat. Paris, 1915, p. 115.

Except that *Trimeresurus borneensis* is now regarded as synonymous with *T. puniceus* there is no change to be recorded in this genus.

Trimeresurus monticola.

Lachesis monticola, Boulenger, p. 216.

A specimen was obtained in the hills east of Chumporn (Isthmus of Kra) near the Burmese border by Mr. Nelson. The range of the species extends into Annam.

Trimeresurus purpureomaculatus.

Lachesis purpureomaculatus, Boulenger, p. 216.

Trimeresurus purpureomaculatus, Sworder, S'pore. Nat. No. 2, 1922, p. 73 and 3, 1924, p. 19.

Trimeresurus gramineus.

Lachesis gramineus, Boulenger, p. 217.

Trimeresurus gramineus, M. A. Smith, Journ. F. M. S. Mus., X, 1922, p. 267 (Fraser's Hill).

Trimeresurus sumatranus.

Lachesis sumatranus, Boulenger, p. 217.

Trimeresurus sumatranus M. A. Smith, Journ. F. M. S. Mus., X, 1922, p. 268 (Kuala Teku).

I have recently examined a specimen from Patani.

Trimeresurus puniceus.

Cophias punicea Boie, Isis, 1827, p. 561.

Lachesis borneensis, Boulenger, Cat. Sn. Brit. Mus., III. 1896, p. 560; De Rooij, Sn. Indo-Austral. Archipel., 1917, p. 286.

Lachesis borneensis, Boulenger, p. 218.

Trimeresurus puniceus M. A. Smith, Journ. Siam Soc., Nat. Hist. Suppl. VII, 1928, p. 194.

A specimen has recently been obtained near Kanburi, Siam, on the Tenasserim border, Lat. 14° N.

Trimeresurus wagleri.

Lachesis wagleri, Boulenger, p. 218; M. A. Smith, Journ. N.H.S. Siam, II. 1916, p. 164, (Patani).

Trimeresurus wagleri, Sworder, S'pore. Nat. No. 2, 1922, p. 73.

The common viper of Singapore according to Sworder. Patani marks its northern range. This snake, and *T. purpureomaculatus,* are the two species commonly kept in the Snake Temple at Penang.

I have examined a specimen from Patani and one from Pangnga on the mainland of peninsular Siam, just north of Puket.

CLASS AMPHIBIA

BATRACHIA, p. 221.

The increasing importance of the tadpole in taxonomy has induced me to compile the following synopsis of the Malayan genera. Besides serving as a key to assist in their identification, it summarises briefly what else is known with regard to the larval period of their lives. The descriptions of the tadpoles will be found under their respective headings.

I. Spiracle sinistral; eyes supero-lateral.

A. Mouth subterminal; lips large, more or less fringed with papillae; horny mandibles and teeth.

Vent dextral; tip of tail pointed; spawn laid in masses in the water ... ... (in part) *Rana.* (in part) *Megophrys.*

Vent dextral; tip of tail pointed; spawn made into frothy nests out of the water ... ... *Rhacophorus. Philautus.*

Vent median; tip of tail pointed; a large ventral adhesive disc behind the mouth ... (in part) *Rana.*

Vent median; tip of tail rounded[1]; spawn laid in strings ... ... *Bufo.*

Spawn laid in strings; tadpole unknown ... *Nectophryne.*

B. Mouth terminal, small, consisting of a short upper and a horse-shoe-shaped lower lip; no fringe of papillae; horny mandibles but no teeth; vent median ... ... *Oœidozyga.*

C. Mouth without mandibles or teeth, the lips much enlarged and forming a funnel; vent median ... ... (in part) *Megophrys.*

II. Spiracle medio-ventral; mouth without horny mandibles or teeth, consisting of a simple upper and a contractile lower lip; eyes entirely lateral; vent median; spawn laid in masses ... ... *Brevicipitidae.*

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[1] Except in *B. penangensis.*

Family **Ranidae**

Genus **Oœidozyga**

Oxyglossus, p. 224.

Oœidozyga Kuhl and Van Hasselt, Isis, 1822, p. 473; M. A. Smith P.Z.S., 1927, p. 202.

Oœidozyga lima.

Oxyglossus lima, Boulenger, p. 225; M. A. Smith. Journ. N.H.S. Siam, II, 1916, p. 172, pl. (tadpole).

Tadpole similar to that of *O. laevis* but the dorsal crest very high at its commencement, rising almost abruptly from the base of the tail and diminishing gradually as it passes backwards.

Oœidozyga laevis [*See* Note, p. 135].

Oxyglossus laevis, Boulenger, p. 225; M. A. Smith, Journ. F. M. S. Mus., X, 1922, p. 271 (Kuala Tahan).

Oxyglossus laevis martensi, M. A. Smith, Journ. N.H.S. Siam, II, 1916, p. 173.

The name *martensi* has been applied to the form from the mainland of Asia, as being smaller (28 - 30 mm. in length) than the one from the Archipelago. This is not strictly correct. Specimens from the Philippines (type locality) and from Flores are considerably larger (42 mm. from snout to vent), but specimens from other parts of the Archipelago that I have examined, (Celebes, Sumbawa) are not larger than those from continental Asia.

Genus **Rana**

Seven species are new to the fauna of the Peninsula. In devising a key to meet their needs, I have taken full advantage of Mr. Boulenger's recent Monograph on the Asiatic and Australian Frogs, published in the Records of the Indian Museum, Vol. XX, 1920.

KEY TO THE SPECIES

I. Digits pointed or with the tips feebly dilated, the dilatation without horse-shoe-shaped horizontal groove separating the upper and lower surfaces; outer metatarsals separated by web, at least in the distal half; no dorso-lateral glandular fold (except sometimes in *R. limborgi* and young of *R. macrodon*). *Rana, sensu stricto.*

A. Inner metatarsal tubercle small but very prominent, pointed, digitiform; digits acutely pointed; toes webbed to the tips ... ... *cyanophlyctis.*

B. Inner metatarsal tubercle blunt or compressed, not digitiform.

a. Toes with obtuse or slightly swollen tips; male with external vocal sacs and with a more or less developed nuptial pad on the first finger.

Toes completely webbed, the web reaching the discs of all the toes, throat with a dark median stripe ... ... *tigrina rugulosa.*

Toes incompletely webbed, the web not reaching the discs of the 2nd and 3rd toes on their inner side; throat marbled ... ... *cancrivora.* ✓

Toes half to two-thirds webbed ... ... *limnocharis.* ✓

b. Toes with the tips dilated into distinct discs; male without pad on the first finger.

1. Tympanum indistinct or hidden; toes 2/3 to fully webbed; male without vocal sacs.

Toes fully webbed; heel not reaching beyond the eye ... ... *kuhli.* 3

Toes not fully webbed; heel reaching beyond the eye ... ... *laticeps.* ✓ 4

2. Tympanum quite distinct; male without vocal sacs.

Toes broadly webbed; skin of the back smooth or with small warts; male with enlarged head and tooth-like projections in the lower jaw ... *macrodon.* ✓

Toes nearly entirely webbed; skin of the back smooth or with irregular glandules; male without enlarged head or tooth-like projections in the lower jaw ... ... *doriæ.* 6

Toes nearly entirely webbed; skin of the back smooth or with irregular glandules; male with enlarged head, with a prominence on the top of the head behind the orbits, and tooth-like projections in the lower jaw ... *macrognathus*

Toes nearly entirely webbed; skin of the back with 8 or 10 longitudinal folds; male with enlarged head, with prominence on the top of the head behind the orbits, and tooth-like projections in the lower jaw ... ... *plicatella.* ✓

Toes $\frac{1}{3}$ to $\frac{1}{2}$ webbed; male with enlarged head and tooth-like projections in the lower jaw ... *hascheana.*

II. Toes, often also fingers, dilated at the end, the dilatation bearing a horse-shoe-shaped horizontal groove separating the upper and lower surfaces; outer metatarsals bound or separated by a groove at the extreme distal portion; no dorsal-lateral fold. *Discodeles.*

Vomerine teeth well developed: toes ½ webbed ... *tasanae.*

Vomerine teeth feebly developed or absent; toes ¼ webbed ... ... *tenasserimensis.*

III. Digital discs as in II; outer metatarsals separated by web, at least in the distal half; dorso-lateral fold present or absent. *Hylarana.*

A. Dorso-lateral fold absent.

Toes ½ to 2/3 webbed; first finger much longer than second; back with flat warts, at least on the sides ... ... *glandulosa.*

Toes ⅔ webbed; first finger much longer than second; back smooth or finely granulate ... *signata.*

Toes not ½ webbed; first finger a little longer than second; back smooth ... ... *luctuosa.*

B. Dorso-lateral fold present.

a. Toes never entirely webbed, at least the terminal phalanx of the fourth being free; discs of fingers small.

1. Dorso-lateral fold narrow, web reaching the discs of third and fifth toes.

Heel reaching end of snout or beyond; male with internal vocal sacs and a gland at the elbow. *cubitalis.*

Heel reaching the eye; male with external vocal sacs and a humeral gland ... ... *miopus.*

Heel reaching end of snout or beyond; limbs very slender; male with internal vocal sacs and no gland on the arm ... ... *alticola.*

2. Dorso-lateral fold broad; web reaching discs of third and fifth toes.

First finger extending beyond second; a small external metatarsal tubercle ... ... *nigrovittata.*

First finger not extending beyond second: external metatarsal tubercle usually absent ... *erythræa.*

3. Dorso-lateral fold narrow; web not reaching discs of third and fifth toes; head distinctly longer than broad.

Toes half-webbed; foot as long as or longer than tibia ... ... *macrodactyla.*

Toes ⅔ webbed; foot as long as or shorter than tibia ... ... *nicobariensis.*

b. Toes nearly entirely webbed; discs of fingers large; dorso-lateral fold moderately broad, distinct only anteriorly ... ... *chalconota.*

c. Toes very broadly webbed, the web involving the discs of all the toes; dorso-lateral fold narrow, poorly developed; vomerine teeth well developed.

Disc of third finger much smaller than tympanum; first finger extending as far as or slightly beyond second; heel to far beyond snout; male with external vocal sacs ... ... *jerboa.*

Disc of third finger much smaller than tympanum; first finger not extending beyond second; heel to beyond end of snout; male with internal vocal sacs ... ... *hosii.*

Disc of third finger nearly as large as tympanum; first finger extending beyond second; heel to beyond end of snout; male with external vocal sacs ... ... *livida.*

IV. Digital discs very large, larger than the tympanum; outer metatarsals completely separated; tympanum small or absent; vomerine teeth feebly developed or absent. *Staurois.**

Vomerine teeth present ... ... *larutensis.*

Rana cyanophlyctis.

Boulenger, p. 228; Annandale, Journ. N.H.S. Siam, II, 1916, p. 91 and Mem. Asiat. Soc. Bengal, VI, 1917, p. 145 (Patelung).

Annandale's discovery of this frog in the Inland Sea, Singgora, is remarkable, as it has not been discovered elsewhere in any part of the Indo-Chinese Peninsula or Malaysia. Cantor's record of specimens said to have come from Penang, cannot be relied upon.

**Staurois* has been redefined by Boulenger (Ann. Mag. Nat. Hist. (9) I, 1918, p. 372) to include this species. I find it completely connected with *Hylarana* through *Rana afghana.*

Rana tigrina rugulosa.

Rana rugulosa Wiegmann, Nova Acta Acad. Leop. Carol., XVII, p. 258, pl. 21; Annandale, Mem. Asiat. Soc. Bengal, VI, 1917, p. 126.

Rana tigrina, (part), Boulenger, p. 234; Robinson and Kloss, Journ. F. M. S. Mus., V. 1915, p. 155 (Koh Pa-ngan).

Rana tigrina pantherina, Boulenger, Rec. Ind. Mus., XX, 1920, p. 21.

The *Rana tigrina* of Boulenger on p. 234 is a composite of *R. tigrina and R. cancrivora*, the difference between the two species, as far as they are concerned in the Peninsula, being the extent of webbing of the toes, the colouration of the throat, and the tadpole.

In *R. tigrina* the toes are fully webbed, and the throat is spotted with black and has a more or less distinct dark median stripe. In *R. cancrivora* the toes are not so completely webbed, the web not reaching the tips of the second and third toes on the inner side, and the throat is marbled with black and white. Annandale's figures in Mem. Asiat. Soc. Bengal, VI, 1917, pl. V., shew these colour distinctions well.

The tadpoles of the two frogs are entirely different as is also the breeding call of the males. The tadpole described by Boulenger (p. 234) is that of *R. t. rugulosa*.

Range. Widely distributed over the Indo-Chinese subregion this frog just reaches the Malay Peninsula in the extreme north. I obtained two specimens at Chumporn, and the example figured by Annandale (1917) is from Koh-Samui.

Rana cancrivora.

Rana cancrivora Gravenhorst, Delic. Mus. Zool. Vratisl., I. p. 41 (1829); Annandale, Mem. Asiat. Soc. Bengal, VI, 1917, p. 128, pl. V; M. A. Smith, Journ. N.H.S. Siam, II, 1917, p. 264 (Chumporn); Boulenger, Rec. Ind. Mus., XX, 1920, p. 23; Sworder, S'pore. Nat., No. 5, 1925, p. 99 (Pulau Senang).

Rana tigrina (part), Boulenger, p. 234.

The tadpole is practically indistinguishable from that of *R. limnocharis.*

Range. *R. cancrivora* has not yet been definitely recorded from the southern part of the Peninsula, except for Sworder's record from Pulau Senang, near Singapore. It is common at the mouth of the Chumporn river and Annandale records it as not uncommon in the vicinity of the Inland Sea, Singgora.

In the neighbourhood of Patani town this frog grows to a much larger size than it does in any other part of its range. It differs also from the form found in any other part of Siam in having a light vertebral stripe (present or absent). The following table will shew the measurements of this new form, for which I propose the name *R. c. raja*, as compared with the typical form.

Rana cancrivora raja, subsp. nov.

	♂	♀
From snout to vent ...	87	120 mm.
Breadth of head ...	28	40 ,,
Hind-limb	130	164 ,,
Foot	43	51 ,,
Author's number (types) ...	7,442	7,395

Rana cancrivora forma *typica*.

	Java		*Bangkok*		*Philippines*	
	♂	♀	♂	♀	♂	♀
From snout to vent ...	77	75 mm.	60	73 mm.	69	67 mm.
Breadth of head ...	25	25 ,,	20	28 ,,	23	22 ,,
Hind-limb ...	117	119 ,,	84	102 ,,	98	94 ,,
Foot	39	38 ,,	29	37 ,,	35	34 ,,

5 ✓

Rana limnocharis.

Boulenger, p. 236; M. A. Smith, Journ. N.H.S. Siam, II. 1916, p. 166 (tadpole).

Ferguson's description of the tadpole, quoted by Boulenger, is incorrect. The larva bears a close resemblance to that of *R. cancrivora.*

Length of head and body about 1½ times its width. Eyes superolateral, about 2½ times as far apart as the nostrils. Tail 1½ to 2 times as long as the head and body, four times as long as high, the tip bluntly pointed; crests, moderate, subequal. Mouth subterminal; lips with short papillae at the sides, and below except for a short gap in the midline. Mandibles edged with black; upper lip with two series of teeth, the outer long and uninterrupted, the inner broadly interrupted; lower lip with three series, all uninterrupted, the outer one very short.

Total length 45 mm.; head and body 12 mm. Olivaceous, speckled with black; posterior half of tail with or without dark bars or entirely black.

Rana kuhli.

Boulenger, p. 229 and Rec. Ind. Mus., XX, 1920, p. 64; M. A. Smith, J. Nat. Hist. Soc. Siam, II, 1917, p. 147, pl. (tadpole).

I have seen a specimen from Bangnara, Patani.

The tadpole has been described from specimens obtained in the north of Siam.

Head and body considerably depressed, one and a half times as long as broad; eyes distinctly on the upper surface of the head; nostrils midway between the eyes and the tip of the snout. Spiraculum sinistral, nearer the eye than the vent which is dextral.

Mouth small, subterminal, with short papillae at the sides and below. Beak broadly edged with black; upper lip with a long, continuous row of teeth, followed by a second broadly interrupted; lower lip with three continuous rows or the upper one narrowly interrupted, the lowest row about half the length of the first and second, which are subequal in length. Tail 4 times as long as high; crests rather low, the upper one a little deeper than the lower.

Total length 45 mm.; head and body 16 mm.; depth of tail 7 mm.

Olive above speckled with blackish; whitish below.

Rana laticeps.

Boulenger, p. 230 and Rec. Ind. Mus., XX, 1920, p. 67; M. A. Smith, Journ. F. M. S. Mus., X, 1922, p. 271 (Pahang).

Common on Fraser's Hill. The range of the species extends into Borneo (Journ. Sarawak Mus., III. 1925, p. 32).

Rana macrodon.

Rana macrodon, Boulenger, p. 233; M. A. Smith, Journ. N.H.S. Siam, II. 1916, p. 165 (Nakon Sritamarat) and Journ. F. M. S. Mus., X, 1922, p. 272 (Pahang).

Rana macrodon var. *blythii,* Boulenger, Rec. Ind. Mus., X, 1920, p. 43.

All specimens of *R. macrodon* from the northern part of the Peninsula differ from those found in the south in having a narrower head, larger eye and longer hind-limbs. They have been named by Boulenger var. *blythii,* who points out however (1920) that "the distinction of this variety is rather vague and the naming of certain specimens is rather arbitrary". The characters moreover do not coincide with any definite geographical distribution, and the name, in a racial sense, cannot be used.

I found this frog common in the Nakon Sritamarat hills, and Robinson and Kloss obtained it at Tapli, Tasan, and Mamoh. The range of the species extends into Annam.

Rana doriæ.

Boulenger, p. 231 and Rec. Ind. Mus., XX, 1920, p. 49; M. A. Smith, Journ. N.H.S. Siam, IV. 1922, p. 217 and Journ. F. M. S. Mus., X, 1922, p. 271 (Kuala Teku).

Robinson and Kloss obtained this frog at Mamoh and Tapli, near the Isthmus of Kra.

Rana macrognathus.

Rana macrognathus, Boulenger, Ann. Mag. Nat. Hist. (8) XX. 1917, p. 414 and Rec. Ind. Mus., XX. 1920, p. 51; M. A. Smith, Journ. N.H.S. Siam, IV. 1922, p. 218 (fig).

Description of the fully grown male. Vomerine teeth in strong oblique series, commencing between the choanae and extending posteriorly beyond them, their distance from each other about

equal to their distance from the choanae. Lower jaw with well developed bony projections in front. Head considerably broader than long, moderately depressed; snout rounded, scarcely projecting beyond the mouth, much longer than the eye; canthus rostralis obtuse, loreal region scarcely concave; nostril a little nearer the tip of the snout than the eye; distance between the nostrils equal to the interorbital width, which is much greater than that of the upper eyelid; tympanum very distinct, as large as or larger than the eye. Starting from between the orbits and extending backwards to the level of the anterior border of the tympanum is a prominent rounded swelling.

Fingers moderate, blunt, first a little longer than second, third as long as the snout; subarticular tubercles moderate. Hind-limb moderately long, the tibiotarsal articulation reaches the eye or a little beyond, the heels overlap when the limbs are folded at right angles to the body; tibia about twice in length of head and body, a little longer than the foot. Toes moderately long, the tips dilated into small but very distinct discs, nearly entirely webbed, the web extending as a fringe to the discs of all the toes; subarticular tubercles moderate; inner metatarsal tubercle, moderately prominent, about half the length of the inner toe; no outer tubercle.

Skin above with irregular glandules; a strong, curved, supratympanic fold.

Olivaceous, with irregular dark markings; usually a dark band between the eye bordered with yellow in front; lips with dark bars, limbs with dark cross bars. Below white, the throat and chest often spotted with brown. No vocal sacs or other sexual characters.

Female without the enlarged head; the interorbital space being narrower and the tympanum smaller.

From snout to vent 48 mm.

Tadpole. Length of head and body $1\frac{2}{3}$ times its breadth, moderately depressed. Eyes superolateral, the distance between them a little greater than that between the nostrils. Tail about three times as long as the head and body, four times as long as high, the tip pointed; crests low, subequal.

Mouth small, subterminal, a fringe of papillae at the sides and below; mandibles edged with black; upper lip with two series of teeth, the inner one narrowly interrupted; lower lip with three series, the inner one interrupted, the outer short, half the length of the second.

Reddish or brownish olive, spotted and speckled with darker.

Total length 35 mm.; head and body 12 mm.

Range. From the Karen hills to the northern part of the Malay Peninsula. Robinson and Kloss obtained it on Pulau Rawi and De Lisle Island (W. coast), and I have obtained it in the Nakon Sritamarat mountains.

Rana plicatella.

Boulenger, p. 231; M. A. Smith, Journ. N.H.S. Siam, IV. 1922, p. 227 (fig.) and Journ. F. M. S. Mus., X, 1922, p. 273 (Fraser's Hill).

Tadpoles which I have referred to this frog closely resemble those of the preceding species. They differ in the longer and narrower tail and in that the upper crest does not reach to the root of the tail.

Rana hascheana.

Rana hascheana, Boulenger, p. 232, and Rec. Ind. Mus., XX, 1920, p. 54; M. A. Smith, Rec. Ind. Mus., XXXI, 1929, p. 77.

Rana limborgi W. L. Sclater, P.Z.S. 1892, p. 344, pl. 24; Boulenger, Rec. Ind. Mus., XX, 1920, p. 56.

My reasons for regarding *R. limborgi* as a synonym of *R. hascheana* have been given elsewhere (l.c.s.). Boulenger's description of this frog does not include the characters of the fully grown male, which apparently has not yet been obtained in the Peninsula. A redescription of the species therefore becomes necessary.

Description of the fully grown male. Vomerine teeth in oblique oval groups just behind the level of the choanae; bony prominences in front of the lower jaw, well developed.

Head large, moderately depressed, as long as broad or a little broader than long, snout rounded, scarcely projecting beyond the mouth, as long as the eye; canthus rostralis obtuse; loreal region moderately oblique, slightly concave; nostril equidistant from the eye and the tip of the snout, or a little nearer the latter; distance between the nostrils equal to or greater than the interorbital width, which equals or exceeds that of the upper eyelid; tympanum distinct, $\frac{2}{3}$ to $\frac{3}{4}$ the diameter of the eye.

Fingers rather short, the tips dilated into small discs, first as long as or slightly longer than the second, third as long as or slightly shorter than the snout; subarticular tubercles moderate.

Hind limb rather long, the tibiotarsal articulation reaching to between the eye and the tip of the snout, or a little beyond; heels overlapping when the limbs are folded at right angles to the body; tibia $1\frac{2}{3}$ to 2 times in length of head and body, as long as or a little longer that the foot. Toes rather short, the tips dilated into small but very distinct discs, $\frac{1}{3}$ to $\frac{1}{2}$ webbed, 3 phalanges of the fourth toe free; subarticular tubercles moderate; inner metatarsal tubercle large, very prominent, compressed, blunt edged, $\frac{2}{3}$ to $\frac{3}{4}$ the length of the inner toe; no outer tubercle.

Skin smooth, usually with more or less distinct traces of a narrow glandular dorsolateral fold beginning behind the upper eyelid; a strong fold from the eye to the shoulder.

Pale brown above with small darker spots; upper surface of snout sometimes pale greyish or yellowish; a dark crossbar between the eyes and often a Λ-shaped marking between the shoulders; a blackish streak on each side of the head, passing through the eye; lips with dark brown vertical bars; a yellowish vertebral stripe sometimes present; limbs with more or less regular dark cross-bands. Lower parts white, throat sometimes spotted or speckled with brown.

No vocal sacs, or other secondary sexual characters except the enlarged head. Female like the male but without the cranial enlargement.

The eggs of this frog are unpigmented, few and very large.

Range. From Upper Burma to Tonkin and the Malay Peninsula. Very common in the northern part of the peninsula. Robinson and Kloss found it abundant at Koh Rah and Mamoh. It has been obtained also on Penang Hill and on Gunong Angsi, Negri Sembilan, at 3,000 feet.

Rana tasanae.

Rana pullus (not of Stoliczka, 1870) M. A. Smith, Journ. F. M. S. Mus., X. 1921, p. 197, pl. 11.

Rana tasanae, M. A. Smith, Journ. N.H.S. Siam, IV. 1921, p. 193.

Vomerine teeth in very oblique series, commencing between the choanae and extending well behind them; tongue without median papilla.

Head rather large, as broad as long, depressed; snout rounded or obtusely pointed, feebly projecting beyond the mouth, a little longer than the eye; canthus rostralis obtuse, loreal region oblique, concave; nostril nearer the tip of the snout than the eye; distance between the nostrils equal to or greater than that of the upper eyelid; tympanum very distinct, $\frac{1}{2}$ to $\frac{2}{3}$ the diameter of the eye.

Fingers moderately long, first slightly shorter than second, discs moderately large; subarticular tubercles large and prominent. Hind limb moderately long, the tibiotarsal articulation reaches the tip of the snout or not quite so far. Discs of the toes like those of the fingers; toes half webbed; outer metatarsals bound together; a feebly prominent inner metatarsal tubercle; no outer tubercle.

Skin smooth, with a glandular network of fine folds on the upper parts. A strong fold from the eye to the shoulder.

Dark grey or blackish above; whitish below, thickly speckled with dark grey except on the belly. Juveniles usually paler, with indistinct crossbars on the limbs.

From snout to vent (♀) 40 mm.; (♂) 33 mm.

Male without vocal sacs and with an enlarged nuptial pad on the first finger.

Eggs large and few, unpigmented.

Range. Known only from Tasan (type locality) and Mamoh, near the Isthmus of Kra.

Rana tenasserimensis.

Rana tenasserimensis W. Sclater, P.Z.S. 1892, p. 345, pl. XXIV; Boulenger, Ann. Mus. Civ. Genova, (2) XIII. 1893, p. 331.

Cornufer tenasserimensis, Boulenger, Ann. Mag. Nat. Hist. (9) I. 1918, p. 373.

Vomerine teeth usually absent, when present very poorly developed; no papilla on the tongue.

Head moderate, depressed, broader than long, snout obtusely pointed, feebly projecting beyond the mouth, as long as the eye; canthus rostralis obtuse; loreal region feebly oblique, concave; distance between the nostrils greater than the interorbital width, which is about equal to that of the upper eyelid; tympanum quite distinct, half the diameter of the eye.

Fingers moderately long with well developed discs; first finger shorter than second, third as long as the snout.

Hind limb moderately long, the tibiotarsal articulation reaches to between the eye and the tip of the snout. Toes with discs like those of the fingers, webbed at the base; outer metatarsals bound together; metatarsal tubercles poorly developed; a feeble internal metatarsal tubercle; no outer tubercle.

Skin smooth or with a few fine longitudinal glandular folds; a feeble fold above the tympanum present or absent.

Olive or greyish (greenish in life) above, with lighter and darker markings; a pale band on either side starting from behind the eye and extending to the middle of the back usually present; limbs with dark bars. Below whitish, the throat usually, and sometimes the whole of the lower parts, speckled with brown.

From snout to vent 25 mm.

Males without vocal sacs.

Eggs very large and few, unpigmented.

Range. Southern Burma and the northern parts of the Malay Peninsula. I found this small frog common on Khao Ram and Khao Ronpibun, in the Nakon Sritamarat mountains, at an elevation of 2,000 feet and higher.

R. tenasserimensis and its near ally *R. tasanae* appear most closely related to the south Indian *R. beddomi* and they are provisionally placed under *Discodeles* Boulenger (Rec. Ind. Mus. XX. 1920, p. 109) the characters of which they exhibit except that they have no lingual papilla.

Rana glandulosa.

Boulenger, p. 236; M. A. Smith, Journ. N.H.S. Siam, II. 1916, p. 167 (Patani) and Journ. F. M. S. Mus. X. 1922, p. 272 (Fraser's Hill).

I have seen a specimen from Langsuan (Lat. 10° N.).

Rana signata.

Rana signata, Boulenger, p. 237; Van Kampen, Amphib. Indo. Austral. Archipel., p. 227 (1923) (*picturata* = *signata*).

Rana picturata, Boulenger, Rec. Ind. Mus., XX. 1920, p. 179; M. A. Smith, Journ. F. M. S. Mus. X. 1922, p. 272 (Pahang).

Robinson and Kloss obtained a specimen at Tasan (Isthmus of Kra).

Van Kampen has regarded (1923) *picturata* as identical with *signata* and I think correctly.

Rana luctuosa.

Boulenger, p. 238; M. A. Smith, Journ. F. M. S. Mus., X. 1922, p. 273 (Fraser's Hill).

Rana cubitalis.

M. A. Smith, Journ. N.H.S. Siam, II. 1917, p. 277 and Rec. Ind. Mus., XXVI. 1924, p. 138 (tadpole); Boulenger, Rec. Ind. Mus., XX. 1920, p. 138.

Vomerine teeth well developed, in oblique series, commencing between the choanae and extending posteriorly beyond them, about as far distant from the choanae as from each other.

Head depressed, as long as broad; snout obtusely pointed, projecting moderately beyond the mouth, a little longer than the eye; canthus rostralis strong; loreal region oblique, deeply concave; nostril equidistant from the eye and the tip of the snout; distance between the nostrils greater than the interorbital width, which is equal to or less than that of the upper eyelid; tympanum very distinct, nearly as large as the eye.

Fingers rather slender, swollen at the end and without horizontal groove between the upper and lower surfaces; first finger much longer than second, third longer than the snout; subarticular tubercles moderately large, prominent.

Hind limb moderately long, the tibiotarsal articulation reaches to the tip of the snout or just beyond; the heels strongly overlap when the limbs are folded at right angles to the body; tibia 1$\frac{2}{3}$ to 1$\frac{3}{4}$ times in length from snout to vent, longer than the foot. Toes moderately long, the tips dilated into small discs, with a horizontal groove between the upper and lower surfaces, nearly entirely webbed, two phalanges of the fourth toe being free; outer metatarsals separated nearly to the base; subarticular tubercles prominent; inner metatarsal tubercle half the length of the first toe; a prominent outer tubercle.

Skin of the upper parts granulate, sometimes with flat, rounded glandules upon the flanks or longitudinal glandular folds upon the hind limbs. A narrow and very prominent dorsolateral fold from above the tympanum to the hip; posterior part of thighs with flattened glandules.

Light greyish-brown or olivaceous above and on the sides, with an irregular chain of small black spots along each flank; a dark brown streak along the canthus rostralis, dark spots on the lips and a patch enclosing the tympanum; limbs with dark cross bars; back of thighs marbled with dark brown and yellow. Lower parts yellowish or whitish sometimes the throat and chest spotted with brown.

Male with internal vocal sacs and with a round flat gland on each side of the breast in front of the base of the arm. A well developed pad on the first finger extending as a broad band on the inner side of the forearm to expand into a large rounded gland at the elbow. In the male the dorsolateral fold is more prominent and all the glandular structures upon the upper parts of the body more strongly developed than in the female.

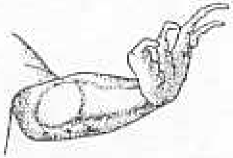

Fig. 5. Arm of *Rana cubitalis.*

From snout to vent 78 mm.; males a little smaller.

Tadpole. Length of head and body 1½ times its breadth, not markedly depressed; snout rounded; nostrils midway between the eyes and the end of the snout, nearly as far apart as the interorbital space; eyes superolateral.

Tail about 3 times as long as high, the tip pointed; crests full, subequal in depth, the upper just extending on to the back.

Mouth large, subterminal, its width nearly half that of the body; a fringe with short papillae at the sides and below. Beak narrowly margined with black, with finely serrated edges; upper lip with 2 long series of teeth, the lowest narrowly interrupted; lower lip with 3 long uninterrupted series.

A patch of granular skin on each side of the back behind the eye.

Colour, above light brown with darker spots.

Total length 38, head and body 14 mm.

Range. Originally discovered in the mountains of north Siam (Doi Nga Chang) this frog has been since found in the Karen Hills and in the mountains of Nakon Sritamarat.

The type specimen is No. 2836 (author's number). B. M. 1919. 3. 28. 5, not the one described by Boulenger.

Rana miopus.

Rana miopus Boulenger, Journ. N.H.S. Siam, III. 1918, p. 11 and Rec. Ind. Mus., XX. 1920, p. 149; M. A. Smith, Journ. F. M. S. Mus. X. 1922, p. 273 (Pahang).

Rana lateralis, Laidlaw, P.Z.S., 1900, p. 886, pl. LVII and (in part), Boulenger, p. 239.

Vomerine teeth in strong, slightly oblique series between the choanae, nearly touching the anterior corners of the latter. Head as long as broad, depressed; snout obtusely pointed, feebly projecting beyond the mouth, slightly longer than the eye; canthus rostralis distinct; loreal region oblique, concave; nostril a little nearer the tip of the snout than the eye; distance between the nostrils a little greater than that between the orbits, which is less than that of the upper eyelid; tympanum very distinct ¾ to quite as large as the eye.

Fingers moderately long, the tips dilated into very small discs, with a horizontal groove between the upper and lower surfaces feebly developed; first finger much longer than the second, nearly as long as the third, which is as long as the snout; subarticular tubercles strong, very prominent.

Hind limb moderately long, the tibiotarsal articulation reaches as far as the eye or a little farther; the heels overlap when the limbs are folded at right angles to the body; tibia about half the length of the head and body, a little longer than the foot. Toes with very small discs, ⅔ to ¾ webbed, two phalanges of the fourth toe being free; outer metatarsals separated nearly to the base, subarticular tubercles very prominent; inner metatarsal tubercle elliptic, very prominent, half the length of the inner toe; outer tubercle feebly developed or absent.

Skin of the back smooth or finely granulate; a narrow glandular dorsolateral fold from above the tympanum to the hip, and a series of fine oblique (from left to right) folds or series of small tubercles between the dorsolateral folds.

Grey or greyish-brown or olivaceous above, uniform or blotched with pink and black and with oblique blackish streaks following the lines of the oblique folds on the dorsum; loreal region and tympanic area dark brown; upper lip white; limbs with more or less distinct dark cross-bars; hinderside of thighs black, speckled or vermiculate with yellow; lower parts white. Young, pinkish and grey above, with the canthus rostralis, superciliary edge and the dorsolateral fold bright pink, the side of the head and body black.

Male with very prominent vocal sacs, appearing as pouches through a slit on either side of the throat in front of the arm, a large flat, oval gland at the shoulder and a nuptial pad on the inner side of the first finger.

From snout to vent 73 mm.

Range. Originally discovered at Kwala Aring in Kelantan, this frog has since been obtained in the Nakon Sritamarat mountains, at Kuala Tembeling and Kuala Tahan in Pahang and in the Chikus Forest Reserve, Perak.

Rana alticola.

Hylorana tytleri, (non Theobald), Stoliczka, Journ. Asiat. Soc. Bengal, XXXIX. 1870, p. 148, pl. IX.

Rana alticola Boulenger, Cat. Batr. Ecaud., p. 52, fig. (1882) and Rec. Ind. Mus., XX. 1920, p. 166; Annandale, Rec. Ind. Mus., VIII. 1912, p. 22 (tadpole); M. A. Smith, Rec. Ind. Mus., XXVI. 1924, p. 138, fig. (tadpole).

Vomerine teeth in short oblique series between the choanae or extending a little beyond the level of their posterior borders, equally distant from each other and from the latter.

Head longer than broad, much depressed; snout a little longer than the eye, more or less obtusely pointed, moderately or feebly projecting beyond the mouth; canthus rostralis strong; loreal region feebly oblique, concave; nostril nearer the end of the snout than the eye; distance between the nostrils equal to or a little less than the interorbital region, which equals or exceeds that of the upper eyelid; tympanum very distinct ⅗ to nearly once the diameter of the eye.

Forelimb slender; fingers long and slender, with small discs which are longer than broad and bear a groove separating the upper from the lower surface; first finger a little longer than the second, third longer than the snout; subarticular tubercles large, very prominent.

Hindlimb long and slender, the tibiotarsal articulation reaching the tip of the snout or beyond; heels strongly overlapping when the limbs are folded at right angles to the body; tibia 1⅔ to 2 times in length from snout to vent, considerably longer than the foot. Toes slender, with discs the same as those of the fingers but a little broader, webbed to the discs of the third and fifth, 2 phalanges (rarely one only) of the fourth free; outer metatarsals separated nearly to the base; subarticular tubercles large and prominent; inner metatarsal tubercle oval, about ¼ the length of the inner toe; a more or less distinct outer tubercle.

Skin smooth; a feebly prominent, narrow, glandular dorsolateral fold from above the tympanum to the hip, another, sometimes indistinct, from behind the tympanum to the shoulder.

Light brown above, scarcely or not spotted, sides dark brown; a light vertebral streak may be present above the coccyx; dorsolateral fold whitish, black-edged on the outer side; upper lip whitish with a dark margin; limbs with or without narrow dark crossbands. Lower parts white, the throat brown or with crowded brown spots, usually with a light median line.

Males with internal vocal sacs; no other secondary sexual characters.

From snout to vent 50 mm. Males are smaller than females.

Tadpole. Length of head and body about 1½ to 1¾ times its breadth, feebly depressed. Eyes superolateral, the distance between them about twice that between the nostrils. Tail 2 to 2½ times the length of the head and body, 3 times as long as high; crests full, subequal.

Mouth large, subterminal; a fringe of papillae at the sides and below; mandibles broadly edged with black; upper lip with 7 or 8 series of teeth, the outer 2 uninterrupted, the rest paired; lower lip with 7 or 8 series all uninterrupted except the innermost.

The young tadpole is yellowish in colour with large black spots, or is entirely black; the fully grown tadpole is dark brown or black with a large orange or yellow ocellus near the base of the tail.

There is a parotid-like flat, oval gland on each side of the body and usually a third near the base of the tail.

Total length 96 mm.; head and body 33 mm.

Range. Hills of Assam, Tonkin, Siam and the northern part of the Malay Peninsula. It has been obtained at Tasan, Tapli, Mamoh, and Nakon Sritamarat. Annandale states he has seen tadpoles which he identifies as belonging to this frog, in Kashmir.

Rana nigrovittata.

Limnodytes nigrovittatus Blyth, Journ. Asiat. Soc. Bengal., XXVI. 1855, p. 718.

Rana nigrovittata, Boulenger, p. 242 and Rec. Ind. Mus. XX. 1920, p. 144; M. A. Smith, Journ. N.H.S. Siam, II. 1916, p. 42, fig. (tadpole) and Journ. F.M.S. Mus., X. 1922, p. 274 (Kuala Teku).

In the male the vocal sacs may shew externally as feebly developed pouches.

Tadpole. Length of head and body 1½ to 1¾ times its breadth, considerably depressed; eyes superolateral, the distance between them not twice that between the nostrils. Tail about twice as long as the head and body, 4 times as long as high, the tip obtusely pointed; crests moderate, subequal.

Month subterminal; a fringe of papillae at the sides and below; beak edged with black; upper lip with two series of teeth the outer long and uninterrupted, the inner broadly interrupted by the beak; lower lip with three series of equal length, the inner narrowly interrupted.

Olive or light brown, speckled with darker.

Total length 50; head and body 13 mm.

Specimens of this frog have been obtained at Tasan (Isthmus of Kra) by Robinson and Kloss and by me in the Nakon Sritamarat mountains.

Rana erythræa.

Boulenger, p. 241 and Rec. Ind. Mus., XX. 1920, p. 152; Van Kampen, Nat. Tijdschr. Ned-Indie, LXIX. 1909, p. 35 (tadpole).

Tadpole. Length of head and body 1¾ times its breadth, moderately depressed. Eye superolateral the distance between them twice that between the nostrils. Tail twice the length of the head and body, 3½ to 4 times as long as high, crests moderate, subequal.

Mouth subterminal, fringed with papillae at the sides and below. Mandibles narrowly edged with black; upper lip with a single series of teeth, lower lip with 2 series, the inner narrowly interrupted.

Greenish or brownish, speckled with darker; usually a dark streak along the sides of the head and body. Fully grown tadpoles usually have a vertebral and two lateral light lines.

Total length 58 mm. head and body 13 mm.

Rana macrodactyla.

Boulenger, p. 238 and Rec. Ind. Mus., XX, 1920, p. 155; M. A. Smith, Journ. N.H.S. Siam, II. 1917. p. 265, figs. (tadpole).

Tadpole. Length of head and body twice its breadth, moderately depressed; eyes superolateral, twice as far apart as the nostrils. Tail twice as long as the head and body, 3½ times as long as high, the tip pointed; crests full, the upper one a little higher than the lower.

Mouth subterminal, with papillae at the sides and below. Mandibles edged with black; upper lip with one long series of teeth; lower lip with 2, the inner interrupted, the outer very short.

Reddish, brownish or olivaceous, with darker markings; below golden or whitish. As with the tadpole of *R. erythræa* the white longitudinal dorsal lines of the frog can be distinguished in the well grown tadpole.

Total length 33 mm.; head and body 11 mm.

Rana nicobariensis.

Boulenger, p. 240 and Rec. Ind. Mus., XX, 1920, p. 162.

I have examined specimens from the Nakon Sritamarat Mountains. The range of the species extends into S. E. Siam.

Tadpoles from Tenasserim, said to belong to *R. nicobariensis* are in the British Museum collection. They closely resemble the larvae of *R. alticola*.

Length of head and body nearly twice its breadth, feebly depressed; snout rounded. Eyes superolateral, the distance between them 1½ times in the distance between the nostrils, which are midway between the eyes and the tip of the snout. Spiraculum a little nearer the eye than the vent. Tail about twice as long as the head and body, three times as long as high, the tip bluntly pointed, crests subequal. Mouth subterminal, fringed with papillae on the sides and below. Beak narrowly edged with black. Upper lip with seven series of teeth, the first two interrupted; lower lip with seven series, only the innermost interrupted. Yellowish-brown with dark spots and markings. Tail with black dots and three or four ocelli. A large oval gland on either side of the back behind the eye, and another below near the base of the tail. Both glands are variable in size.

The tadpole assigned to this frog by van Kampen, with doubt, is quite different. (Amphib., Indo-Austral. Archipel., 1923, p. 224).

Rana chalconota.

Hyla chalconota Schlegel, Abbild., p. 24, pl. IX (1837).

Rana labialis, Boulenger, p. 242; M. A. Smith, Journ. N.H.S. Siam, II, 1916, p. 168 (Nakon Sritamarat); Van Kampen, Amphib. Indo-Austral. Archipel., 1923, p. 220.

Rana chalconota, Boulenger, Rec. Ind. Mus., XX, 1920, p. 201; M. A. Smith, Journ. F. M. S. Mus., X, 1922, p. 274 (Kuala Teku); Van Kampen, Amphib. Indo-Austral. Archipel., 1923. p. 217.

I found this frog common in a large swamp at Khao Ram in the Nakon Sritamarat Mountains. Its habits were entirely arboreal. Robinson and Kloss also obtained it at Tasan and Mamoh (Isthmus of Kra).

Dr. van Kampen (in litt.) agrees with me that *R. labialis* should be united with *R. chalconota.*

Rana jerboa.

Boulenger, p. 244 and Rec. Ind. Mus., XX. 1920, p. 196.

Boulenger's statement that the male of this frog has internal vocal sacs is a slip which he later corrected. There is a small external vocal sac on each side of the throat.

The tadpoles referred to by Boulenger (Cat. Batr., 1882, p. 89 and Rec. Ind. Mus., 1920, p. 199) from Bantam, Java, as belonging to the species are probably correctly identified, but his description of the mouthparts of the tadpole is not correct.

The three specimens are much sodden and the teeth are now rubbed off, but the dental fringes shew the formula to be $4 \pm 4/5 \pm 5$.

Whether the tadpoles really came from Java is open to doubt. They were purchased from a dealer and said to have been collected by Mr. H. O. Forbes.

Rana hosii.

Rana hosii, Boulenger, p. 243, and Rec. Ind. Mus., XX. 1920 p. 199; M. A. Smith, Journ. F. M. S. Mus., X, 1922, p. 274 (Gunong Tahan).

Rana cataracta, M. A. Smith, Journ. F. M. S. Mus., X, 1922, p. 274 (Nakon Sritamarat and Fraser's Hill).

After comparing my *Rana cataracta* with the specimens of *R. hosii* in the British Museum, I find that I must unite the two species. The male of *R. hosii* differ from the female in having a larger eye, larger tympanum and more prominent dorsolateral fold. All the specimens from Nakon Sritamarat that I have seen were of a bright green colour above in life. Robinson and Kloss obtained a single example at Tasan (Isthmus of Kra).

The habits of this species are those of a tree-frog. The call of the male, heard at night only, is a short whistling cry, sometimes almost a scream.

Van Kampen (Amphib. Indo-Austr. Archipel., 1923, p. 216) has referred the Bantam tadpoles (mentioned under *R. jerboa*) to *R. hosii*, but as I have there shewn, probably incorrectly.

Rana livida.

Rana livida, Boulenger, p. 245 and Rec. Ind. Mus., XX, 1920, p. 214.

Rana graminea, Boulenger, Rec. Ind. Mus., XX, 1920, p. 204.

I have examined two specimens from the Nakon Sritamarat Mountains. The species is widely distributed over the Indo-Chinese subregion. It extends east as far as Tonkin and Hainan, the frog described by Boulenger under the name of *R. graminea* being in my opinion identical with *R. livida*.

The tadpole of *R. livida* is I believe not yet known. My reasons for referring the larva which I described as that of *R. livida* (Rec. Ind. Mus., XXVI, 1924, p. 134) to *R. afghana*, have been given elsewhere. (Rec. Ind. Mus., XXXI, 1929, p. 78).

Rana larutensis.

Rana larutensis, Boulenger, p. 245; M. A. Smith, Journ. F. M. S. Mus., X. 1922, p. 277 (Pahang).

Staurois larutensis, Boulenger, Ann. Mag. Nat. Hist., (9) I, 1918, p. 374.

Robinson and Kloss obtained this frog at Tapli and Tasan (Isthmus of Kra) and I have examined a large series from Ban Chanaha and Betong (Patani).

Van Kampen includes Borneo in the range of this species. (Amphib. Indo-Austr. Archipel., 1923, p. 234).

Noble has recently (Ann. N. York Acad. Sci., XXX, 1927, p. 107) redefined the genus *Staurois* to include all those species of *Rana* in which the larva is provided with a ventral sucker behind the mouth. He states "there is no real difference in the anatomy of the adults and I have referred them all to *Staurois*. Thus a larval character . * . * . * . * . has pointed the way towards what I believe to be the only natural grouping of a difficult division of frogs".

If all the frogs with a ventral sucker have been correctly identified, however, the resulting group does not appear to me to be a very natural one, as instanced by *R. jerboa*, *R. cavitympanum*, *R. whiteheadi* on the one hand and *R. larutensis*, *R. afghana* and *R. natator* on the other.

A parallel condition of affairs is to be found in the larvae of *Bufo penangensis* and *B. asper*, species which neither closely resemble one another nor have characters by which they can be separated from the genus *Bufo*.

The ventral sucker, in fact, like the adhesive mouth which is found in tadpoles in other parts of the world and in genera which are quite unrelated to one another, is evidently an adaptive character, developed to enable the creature to cope with its environment, the mountain torrent, and not an ancestral one.

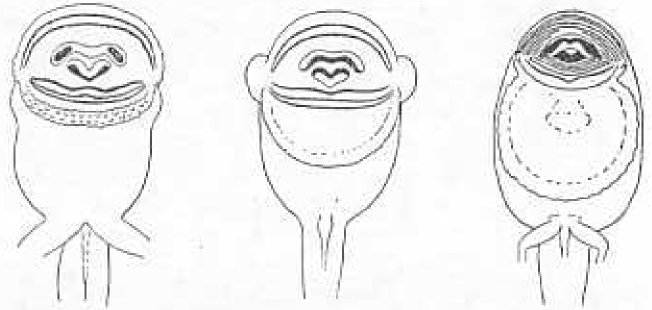

Fig. 6. Tadpoles of *Bufo penangensis*, *B. asper* and *Rana larutensis*.

Genus **Rhacophorus**

Boulenger, p. 247.

My reasons for using the name *Rhacophorus* in preference to *Polypedates* have been given recently in P.Z.S. 1927, p. 213.

Three species are added to the fauna of the Peninsula. The amended key will read as follows:—

I. Fingers free or with a rudiment of a web; snout rounded.

Upper parts very warty	*leprosus.*
Upper parts smooth; skin of head in the adult involved in the cranial ossification; choanae moderate	*leucomystax.*
Upper parts smooth; skin of head not involved in cranial ossification; choanae very large ...	*colletti.*

II. Outer two fingers half webbed; snout very pointed, strongly projecting ... *appendiculatus chaseni.*

III. Fingers entirely webbed; snout rounded.

No cutaneous fold along the limbs; loreal region nearly vertical ... ... *robinsoni.*

Cutaneous folds along the limbs and above the vent feebly developed; loreal region oblique *bimaculatus.*

Cutaneous folds along the limbs strongly developed; anal fold strongly projecting; loreal region oblique ... ... *prominanus.*

Cutaneous folds along the limbs and above the vent strongly developed; loreal region oblique ... ... *nigropalmatus.*

Rhacophorus leprosus, Boulenger, p. 247.

Rhacophorus leucomystax, Boulenger, p. 248.

Rhacophorus colletti.

Boulenger, P.Z.S. 1890, p. 36; M. A. Smith, P.Z.S. 1924, p. 225 (Patani).

Vomerine teeth in two oblique series between the very large choanae. Head subtriangular in shape as long as broad; snout a little longer than the diameter of the orbit; canthus rostralis angular; loreal region oblique, slightly concave; nostril nearer the tip of the snout than the eye; interorbital space a little broader than the upper eyelid; tympanum very distinct, ¾ the size of the eye. Discs of fingers about half as large as the tympanum, of toes smaller; fingers with a slight rudiment of a web, toes nearly entirely webbed; subarticular tubercles moderate; a very small inner metatarsal tubercle; the tibiotarsal articulation reaches far beyond the tip of the snout.

Skin of the head free; upper parts smooth, belly and lower surface of thighs granulate.

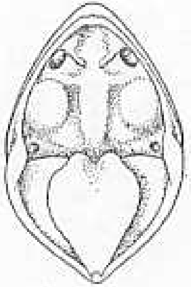

Fig. 7. Open mouth of *Rhacophorus colletti*

Greyish or greyish-brown above, loreal region and sides of body lighter; back usually with an X-shaped dark mark; sides and back of thighs marbled with black and yellowish; limbs with dark cross-bars; anal region blackish, with a white edge above; lower parts whitish, the throat with or without dark vermiculations.

From snout to vent 75 mm.

Mr. Aagaard obtained two specimens of this frog at Bangnara, Patani. Otherwise it is known only from the Malay Archipelago.

Rhacophorus appendiculatus chaseni.

Polypedates appendiculatus Gunther, Cat. Batr. Sal., p. 79 (1858).

Rhacophorus chaseni, M. A. Smith, P.Z.S. 1924, p. 226, pl. 1, fig. 1.

Vomerine teeth in slightly oblique groups touching the anterior inner borders of the choanae. Head longer than broad, much depressed, triangular in shape; skin over the cranial region not adherent to the bone; snout acutely pointed, projecting beyond the nostrils in a pronounced tip, much longer than the orbit; canthus rostralis distinct; loreal region very oblique, concave; nostril considerably nearer the tip of the snout than the eye; interorbital space nearly twice as broad as the upper eyelid; tympanum distinct, three-fifths the diameter of the eye, its distance from the eye half its own diameter, clearly visible from above owing to the unusual slope of the temporal region.

Outer two fingers nearly half webbed, inner fingers slightly less; discs of the fingers as broad as long, two-thirds the size of the tympanum; toes fully webbed, their discs not as large as those of the fingers; subarticular tubercles well developed; a prominent inner metatarsal tubercle one-third the length of the inner toe no outer tubercle. Hindlimb slender, the tibiotarsal articulation reaches nearly to the nostril.

Skin smooth above, strongly granular on the belly and below the thighs, throat smooth; a fold from the eye to the shoulder; a denticulate dermal fold from the elbow along the outer side of the forearm and hand, another along the outer side of the foot terminating at the tarsometatarsal joint in a pointed flap; a strong fold below the vent interrupted in the middle, and a denticulate fringe along the ramus of the lower jaw.

Greyish above, speckled with darker; below greyish white. Inner fingers and toes paler than the outer; interdigital membranes dark grey.

From snout to vent 50 mm.

Range. The Malay Peninsula and Borneo. Differs from the typical form which inhabits the Philippines in the longer snout and in the stronger and more denticulate cutaneous fringes upon the limbs and jaw.

The two specimens known were collected near the Teku river, Gunong Tahan (altitude 1,500 metres) by Mr. F. N. Chasen.

Rhacophorus robinsoni, Boulenger, p. 249.

Rhacophorus bimaculatus.

Boulenger, p. 250; M. A. Smith, Journ. F. M. S. Mus., X. 1922, p. 278 (Fraser's Hill).

The species is common in the Nakon Sritamarat mountains.

The tadpole is indistinguishable from that of *Rh. reinwardti*. Length of head and body $1\frac{2}{3}$ times its breadth, moderately depressed. Eyes superolateral, farther apart than the nostrils. Tail $1\frac{1}{2}$ to 2 times as long as the head and body, 3 times as long as high, the tip pointed. Mouth subterminal, with papillae at the sides and below; beak edged with black; upper lip with five or six series of teeth, all except the outer row paired; lower lip with three continuous series.

Greyish above, paler below.

Total length 26 mm.; head and body 11 mm.

Rhacophorus prominanus.

M. A. Smith, Journ. F. M. S. Mus., XI. 1924, p. 185, fig.

Vomerine teeth in transverse or slightly oblique series between the choanae. Head broader than long, much depressed; snout rounded or obtusely pointed, projecting feebly beyond the mouth, considerably longer than the orbit; nostril a little nearer the tip of the snout than the eye; canthus rostralis distinct, loreal region oblique, concave; interorbital space much broader than the upper eyelid; tympanum very distinct, $\frac{4}{5}$ the size of the eye.

Fingers broadly webbed, the membrane between the outer three involving the discs; discs large, broader than long, that of the third broader than the tympanum. Toes fully webbed, their discs much smaller than those of the fingers; subarticular tubercles well developed; a small, oval inner metatarsal tubercle, $\frac{2}{5}$ the length of the inner toe; outer metatarsals completely separated; the tibiotarsal articulation reaches the tip of the snout.

Skin of the back smooth or with small scattered tubercles, skin of the head free; of the belly coarsely granular. A strong fold of skin along the outer side of the arm and hand and another along the outer side of the foot as far as the heel. Anal region with a strongly projecting rounded or squarish cutaneous flap, the vent opening in the middle of its under surface.

Light yellowish-brown above, (verdant green in life) with numerous small dark punctiform spots; below yellowish-white, uniform. Supraorbital region and anal flap ochreous yellow, web of fingers greenish yellow, web of toes yellow at base, carmine at the margin.

From snout to vent 68 mm.

Distinguished from *Rh. reinwardti*, its nearest ally, by the less broadly webbed toes, the prominent anal flap and coloration.

Originally discovered at Jor, Batang Padang, Perak, this frog has since been obtained at Banang Star in Patani.

Rhacophorus nigropalmatus, Boulenger, p. 251.

Count Gyldenstolpe obtained a specimen of this frog in the extreme north of Siam.

Genus **Philautus**
Ixalus, p. 252.

Philautus Gistel, Naturg, Thierr., 1848, p. 10; Stejneger, Proc. U. S. Nat. Mus., XXVIII. 1905, p. 346.
Ixalus, Boulenger, p. 252 (name preoccupied).

Examination of large series of *Philautus* have convinced me that several of the characters used by Boulenger to distinguish the species cannot be relied upon. The size of the tympanum is variable and is usually more distinct in the adult than in the young, comparison of it therefore with the size of the finger discs is unsatisfactory. The length of the hind limb may shew considerable variation in individuals of the same species, while the skin of the upper parts of some species is tubercular in the young but smooth in the adult. Bearing these points in mind, I find myself unable to separate *P. castanomerus* and *P. larutensis* from *P. petersi*, and *P. brevipes* from *P. vermiculatus*. One species, *P. bimaculatus* is added to the fauna of the Peninsula.

It is now generally recognized that the presence or absence of vomerine teeth can no longer be regarded as a character of generic distinction. Although fully accepting this principle I am not in agreement with those authors who have hastily sunk all the species of *Philautus* under *Rhacophorus*. That some forms of *Philautus* should be placed under *Rhacophorus* is no doubt correct, but the distinctive habit of many other species, suggests that characters will yet be found to retain them apart from *Rhacophorus*. Until a proper revision of the whole group is undertaken, I prefer to retain the two genera as defined by Boulenger.

KEY TO THE SPECIES

I. Fingers free or with a rudiment of a web; outer metatarsals bound together or separated only distally.

A. Upper parts smooth or with soft tubercles; tympanum not very distinct.

Head moderate, triangular in shape, snout pointed ... ... *petersi*.
Head large, snout rounded ... ... *vermiculatus*.

B. Upper parts rough with granular asperities; tympanum very distinct.
Snout pointed; loreal region nearly vertical; toes half webbed ... ... *pictus*
Snout rounded; loreal region oblique; toes ¾ webbed ... ... *asper*.
II. Outer two fingers ⅔ webbed; outer metatarsals separated nearly to the base.
Eye larger than its distance to the nostril; skin smooth ... ... *bimaculatus*.
Eye smaller than its distance to the nostril, skin rough with granular asperities ... ... *horridus*.

Philautus petersi. = P. aurifasciatus (Schlegel)

Ixalus petersi, Boulenger, p. 252 and *P.Z.S.* March 1900, p. 185, fig.

Philautus petersi, M. A. Smith, Journ. Sarawak Mus. III. p. 1925, p. 10 (*castanomerus=petersi*).

Ixalus larutensis, Boulenger, Ann. Mag. Nat. Hist., Aug. (7) VI. p. 187 (1900) and Fauna. p. 253.

Ixalus castanomerus Boulenger, Journ. F. M. S. Mus., I. 1905, p. 39, pl. IV. and Fauna, p. 254; M. A. Smith, Journ. F. M. S. Mus., X. 1922, p. 280 (Pahang).

The range of this small frog extends into Northern Siam (Khun Tan, Lat. 18° N.) and Southern Cambodia. I have found it frequently among dry leaves on a jungle path often at a considerable distance from any stream. The male has a large subgular vocal sac.

P. petersi appears most closely related to the Javan *P. aurifasciatus* from which it differs in having a larger and more triangular shaped head.

Philautus vermiculatus.

Ixalus vermiculatus, Boulenger, p. 254.

Ixalus brevipes, Boulenger, 253.

Philautus brevipes, M. A. Smith, Journ. F. M. S. Mus., X, 1922, p. 279 (Pahang).

Coloration very variable. Usually greyish olive above, with symmetrical markings or with vermiculations.

Philautus pictus.

Ixalus pictus, Boulenger, p. 255.

I have seen a specimen from Banang Star, Patani. The species has been recently discovered in the Mentawi Islands (Ann. Mag. Nat. Hist., (9) XVIII, 1926, p. 78).

Philautus asper.

Ixalus asper. Boulenger, p. 255.

The range of the species extends into northern Siam and Annam (Langbian plateau).

5 **Philautus bimaculatus.**

Leptomantis bimaculata Peters, Monatsb. Akad. Berlin, 1867, p. 32.

Philautus bimaculatus, van Kampen, Amphib. Indo-Austral. Archipel., p. 269, 1923.

Eye large, prominent, its diameter greater than its distance from the nostril; head triangular in shape; snout obtusely pointed; nostrils a little nearer the tip of the snout than the eye; canthus rostralis angular; loreal region feebly oblique, feebly concave; interorbital width greater than that of the upper eyelid; tympanum distinct, not quite half the diameter of the eye. Fingers with discs as large as the tympanum; the inner one feebly opposed to the outer three; outer two fingers ⅔ webbed, inner two webbed at the base. Toes nearly entirely webbed, their discs smaller than those of the fingers; outer metatarsals separated nearly to the base; subarticular tubercle moderately developed; a feeble inner metatarsal tubercle; no outer tubercle; the tibiotarsal articulation reaches to beyond the tip of the snout.

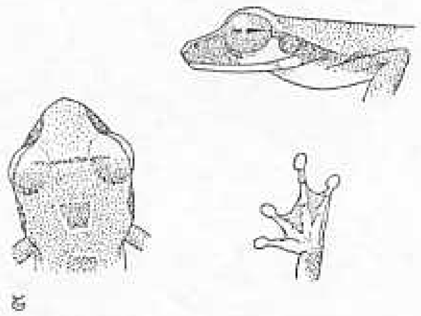

Fig. 8. Head and hand of *Philautus bimaculatus*.

Skin smooth with occasional small tubercles; belly and hinder part of thighs granulate.

Violet-brown above, uniform or with irregular spots and blotches; dark crossbars on the limbs, a dark bar between the eyes and yellowish-white blotches on the lips below the eyes; lower parts dirty-whitish. Male with a subgular vocal sac opening by a large slit on either side of the tongue.

From snout to vent 34 mm.

Peters' original description, which appears to have been copied by subsequent authors without reference to the type, differs from the above in several important points.

The above description is drawn up from the type in Berlin, a specimen from Sarawak in the British Museum collection and two more obtained in Peninsular Siam, one near Setun, S. W. of Patelung and the other from Tasan, near Chumporn. The drawing is from the last named, which is now in the national collection.

Philautus horridus.

Ixalus horridus, Boulenger, p. 256.

The range of the species extends to the Mentawi Islands (Ann. Mag. Nat. Hist., (9) XVIII, 1926, p. 80).

Family **Brevicipitidae.** = Microhylidae.

Engystomatidae, p. 257.

Dyscophidae, Boulenger, Fauna Brit. Ind., p. 498 (1890).

I. Upper jaw toothed.

A transverse series of vomerine teeth behind the choana ... ... *Calluella.*

II. Both jaws toothless.

A. Procoracoids present, clavicles absent.

Vomer forming a sharp transverse ridge behind the choana; fingers free; metatarsal tubercles large, rounded ... *Kaloula.*

A transverse dermal ridge behind the choana; fingers webbed at the base; metatarsal tubercles very large, flat ... *Phrynella.*

B. Procoracoids and clavicles absent.

No ridge behind the choana; fingers free ... *Microhyla.*

C. Clavicles present.

A transverse dermal ridge behind the choanae* and one of two in front of the pharynx; digits not dilated ... ... *Kalophrynus.*

No dermal ridge behind the choana; one or two in front of the pharynx; digits with distinct discs ... ... *Sphenophryne.*

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*The figure on p. 257 of the Fauna shewing an uninterrupted ridge across the plate is incorrect.

Genus **Calluella**

Calluella Stoliczka, Proc. Asiat. Soc. Bengal, 1872, p. 146; Boulenger, Fauna Brit. Ind., p. 498 (1890), fig.

Pupil diamond-shaped; tongue oval, entire and free behind. Vomer with a transverse series of teeth behind the choana; two cutaneous transverse folds in front of the pharynx. Tympanum hidden. Fingers free, toes webbed, the tips not dilated; outer metatarsals united. Coracoids strong; clavicles weak, curved, lying close to the coracoids; no omosternum; sternum a large two-headed cartilaginous plate. Diapophyses of sacral vertebra moderately dilated; terminal phalanges simple.

A single species in the Peninsula.

Whether the tooth-bearing bone in the region of the palate represents the vomer and palatine bones which have fused with one another, or the vomer only, the palatine having disappeared, it is difficult to say. Judging from analogy with other Brevicipitids it would seem correct to regard the toothed bone in *Calluella* as vomer and not palatine.

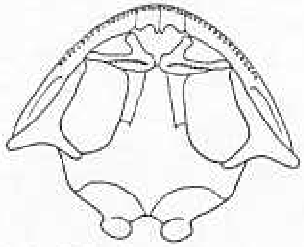

Fig. 9. Skull of *Calluella guttulata* (lower aspect).

Calluella guttulata.

Megalophrys guttulata Blyth, Journ. Asiat. Soc. Bengal, XXIV, 1855, p. 717.

Calluella guttulata, Boulenger, Fauna Brit. Ind., p. 498 (1890); M. A. Smith, Journ. N.H.S. Siam, II. 1917, p. 270, fig. (tadpole).

Head short, nearly twice as broad as long, snout broadly rounded; nostrils equidistant from the eye and the tip of the snout, the distance between them equal to the interorbital width which is greater than that of the upper eyelid. Fingers moderate, first shorter than second; toes moderate, about ⅓ webbed; subarticular tubercles well developed; inner metatarsal tubercle large, shovel-shaped; outer tubercle much smaller, rounded; the tarso-metatarsal tubercle reaches the eye.

Skin smooth, with or without soft rounded tubercles upon the back. A fold across the head behind the eyes usually present.

Colour very variable. Olive, grey, greenish, yellow or brown, with large, dark, light edged spots of sinuous outline usually present; a dark band behind the thighs enclosing the vent; limbs with dark cross-bars. Young specimens have more often a single large dark blotch upon the back terminating in a **Y**-shaped mark connecting with the eyes. Below yellowish or whitish.

Male with a subgular vocal sac, which becomes black in the breeding season.

From snout to vent (♀) 48 mm.; (♂) 45 mm.

Description of the tadpole. Length of head and body $1\frac{1}{3}$ times its breadth, snout broadly rounded; nostrils midway between the eyes and the tip of the snout. Eyes perfectly lateral, 4 or 5 times as far apart as the nostrils. Tail 4 to 5 times as long as high, ending in a fine point; crests low, almost straight, the upper one-half the height of the lower.

Pale greenish, greyish or brownish, more or less translucent, sometimes almost colourless. Some dark patches of pigment at the nostrils, between the eyes, and at the base of the tail; posterior part of tail black.

Total length 40 mm.; head and body 12 mm.

The tadpoles assume an oblique position in the water; they congregate in large colonies, all the individuals composing it being closely packed together with their heads turned in the same direction.

Range. Southern Burma and the northern part of the Malay Peninsula. Robinson and Kloss obtained two specimens at Tasan (Isthmus of Kra) and I have seen another from Chumporn.

Genus **Kaloula.**

Callula, p. 263.

Kaloula Gray, Zool. Miscell., p. 38 (1831).

Pupil round or diamond-shaped, tongue oblong, entire and free behind. Vomer forming a sharp, transverse ridge behind the choana; palatine much reduced, its inner extremity underlying the vomer. Two transverse dermal, more or less denticulated, ridges in front of the œsophagus. Tympanum hidden. Fingers free; toes free or webbed; tips of fingers and toes more or less dilated. Outer metatarsals united.

Procoracoids small, subtriangular in shape; omosternum small, sternum large, both cartilaginous. Diapophyses of sacral vertebrae moderately dilated.

Range. The greater part of the Oriental region.

Two species in the Peninsula.

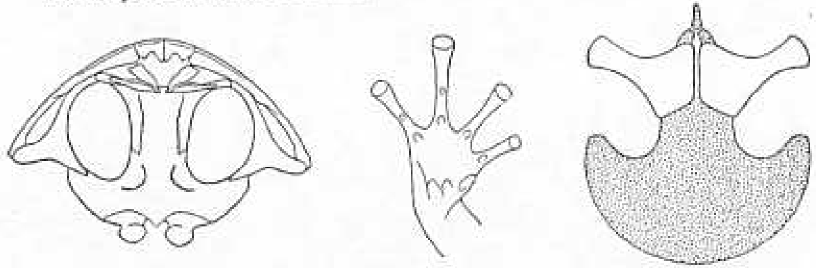

Fig. 10. Skull (lower aspect) hand and sternal apparatus of *Kaloula pulchra.*

Discs of fingers moderately large, their width not twice that of the narrowest part of the penultimate phalanx; toes webbed at the base *pulchra.*

Discs of fingers very large, their width more than twice that of the narrowest part of the penultimate phalanx; toes at least ⅓ webbed. *balcata.*

5 ✓

Kaloula pulchra.

Callula pulchra, Boulenger, p. 264; M. A. Smith, Journ. N.H.S. Siam, II. 1916, p. 40, fig. (tadpole).

Kaloula pulchra, Annandale, Mem. Asiat. Soc. Bengal, VI. 1917 p. 152, fig. (tadpole).

Tadpole. Length of head and body $1\frac{1}{2}$ times its breadth, snout very broadly rounded. Eyes six times as far apart as the nostrils. Tail twice as long as the head and body, with obtusely pointed tip; crests moderate, sub-equal.

Dark olive-brown to black, usually finely speckled with gold.

Total length 40 mm.; head and body 14 mm.

✓

Kaloula baleata.

Bombinator baleatus S. Muller, Verh. Batav. Gen., XVI, 1836, p. 96.

Kaloula baleata, van Kampen, Amphib. Indo-Austral. Archipel., 1923, p. 148. fig; M. A. Smith, Journ. F. M. S. Mus., X. 1922, p. 282 (Kuala Tahan).

Head much broader than long; snout short, rounded, as long as, or a little shorter than, the upper eyelid; canthus rostralis rounded; loreal region oblique; nostril nearer the tip of the snout than the eye; interorbital space broader than the upper eyelid. Tips of fingers with large, triangular disks; their breadth more than twice that of the narrowest part of the penultimate phalanx; first finger shorter than second; tips of toes feebly dilated, third toe distinctly longer than the fifth; toes at least one-third webbed; subarticular tubercles distinct; two metatarsal tubercles, the inner large, compressed, with blunt edge, the outer smaller; the heel reaches the shoulder (in the adult) or the eye (in the young).

Upper parts smooth, or with small, flat warts; a fold from the eye to the shoulder; lower parts smooth, throat finely granulate.

Brown, olive or blackish above, uniform or variegated with darker; a few large, whitish (red in life) spots on the armpits, loins and limbs; below whitish, variegated with brown.

From snout to vent 76 mm.

Male with a subgular vocal sac.

Tadpole similar to that of *K. pulchra.*

Range. Malay Peninsula and Archipelago.

The F. M. S. Museums obtained a single specimen at Kuala Tahan.

Genus **Phrynella**

Phrynella, Boulenger, p. 265.

Kaloula, M. A. Smith, Ann. Mag. Nat. Hist., (9) XVIII. 1926, p. 81.

Pupil diamond-shaped. Tongue oblong, free behind. A transverse dermal ridge behind the choana and two, more or less denticulated, transverse ridges in front of the œsophagus. Tympanum hidden. Fingers webbed at the base, with very large flat, subarticular tubercles; toes webbed; tips of fingers and toes strongly dilated. Vomer much reduced, only the anterior portion being present; no palatine bone. Procoracoids very small, subtriangular in shape; omosternum and sternum cartilaginous.

A critical examination of the skulls of *Phrynella** and *Kaloula** shew that they differ so much as regards the vomer and palatine bones, that my grounds for uniting the two genera (1926) must be abandoned.

KEY TO THE SPECIES

Toes at least ¾ webbed ... ... *pulchra.*
Toes hardly ½ webbed; male with a strong tubercle-like rudiment of pollex ... ... *pollicaris.*

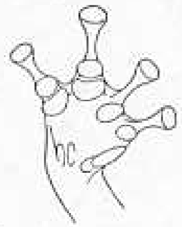

Fig. 11. Hand of *Phrynella pulchra.*

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*The genotypes *Phrynella pulchra* and *Kaloula pulchra* examined.

Phrynella pulchra.

Phrynella pulchra, Boulenger, p. 265; M. A. Smith, Journ. F. M. S. Mus., X. 1922, p. 282 (Kuala Tahan).

Kaloula boulengeri, M. A. Smith, Ann. Mag. Nat. Hist., (9) XVIII. 1926, p. 81.

Phrynella pollicaris, Boulenger, p. 266.

Five specimens were obtained in the Cameron's Highlands by the F. M. S. Museums in 1923 at an altitude of 5,000 feet.

Colour in spirits. Dark purplish brown above, uniform or with faint yellowish mottlings upon the hind-limbs; paler below.

In the two males the prepollex projects through the skin as a sharp, pointed spike, a condition which probably occurs only at the nuptial period.

The females have small darkly-pigmented ova.

Genus **Kalophrynus**

Calophrynus, p. 257.

Kalophrynus Tschudi, N. Class. Batr., 1838, p. 86.

KEY TO THE SPECIES

Fourth finger normally developed ... ... *pleurostigma.*
Fourth finger very short ... ... *robinsoni.*

Kalophrynus pleurostigma.

Calophrynus pleurostigma, Boulenger, p. 258.

It is recorded that this species "lives in small holes in tree-trunks, often at a considerable height from the ground (p. 258)". In the absence of any digital adaptation for climbing, I doubt if this statement is correct. All those I have met with were on the ground

Kalophrynus robinsoni.

M. A. Smith, Journ. F. M. S. Mus., X, 1922, p. 280.

Dermal ridge across the palate behind the choanae obtusely **V**-shaped and interrupted in the middle.

Tongue elliptic, entire. Snout short, truncate, projecting slightly beyond the mouth; canthus rostralis distinct, loreal region vertical, feebly concave; interorbital region broader than the upper eyelid; tympanum usually distinct, two-thirds the diameter of the eye. First and second fingers very short, not half the length of the third, fourth shorter still; toes one-third webbed, the web extending as a fringe along the outer sides of the toes; fifth toe shorter than the third; tips of fingers and toes bluntly pointed; a feebly developed oval inner metatarsal tubercle and a rounded outer one. The tibio-tarsal articulation reached the tympanum.

Skin of the back granular, with small scattered tubercles; a series of tubercles along the dorsolateral region from the eye to the groin and another along the hinder side of each thigh; belly and groin with large coarse granules; throat with finer granules; a curved fold from the eye to the shoulder.

Light brown, sometimes with a pink tinge above, with dark brown markings. in particular a large one on the back extending forwards in two branches to the eyelids, and backwards, in two longer branches to the groins; sides of head and body very dark brown, this colour sharply defined from the light brown of the back; limbs with dark cross bars, and a dark patch enclosing the vent and extending along the back of the thighs. Below yellowish, spotted and speckled with brown.

From snout to vent 17 mm.

Type locality Wray's Camp, Gunong Tahan. A specimen has also been obtained at Kuala Teku.

Genus **Sphenophryne** (*see* note, p. 135).
Microhyla (part), p. 258.

Sphenophryne Peters & Doria, Ann. Mus. Civ. Genova, XIII. 1878. p. 430.

Chaperina, Mocquard; Mem. Soc. Zool. France, V. 1892, p. 194.

Pupil horizontal. Tongue entire or feebly nicked and free behind. Palate toothless. One or two transverse dermal ridges in front of the œsophagus. Tympanum distinct or hidden. Fingers free, toes free or webbed at the base, with discs. Outer metatarsals united. Precoracoids and clavicles present, the latter reaching the scapulae; no omosternum.

Range. The Malay Peninsula and Archipelago; New Guinea; Northern Queensland.

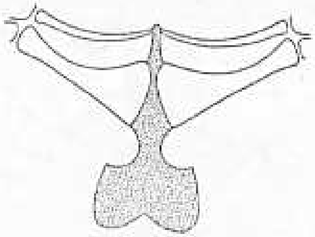

Fig. 12. Pectoral girdle of *Sphenophryne fusca.*

Sphenophryne fusca.

Chaperina fusca, Mocquard, Mem. Soc. Zool. France, V. 1892, p. 194, figs.

Microhyla leucostigma, Boulenger, p. 260.

Sphenophryne leucostigma, M. A. Smith, Journ. Sarawak Mus., III, 1925, p. 12.

The history of this small frog has been given in the Journal of the Sarawak Museum.

Dr. Van Kampen has pointed out a slip of mine in naming it *leucostigma*, Mocquard's name *fusca* having priority over Boulenger's by seven years.

Boulenger's description (p. 260) omits mention of the dermal spines on the heels and elbows.

There are tadpoles of this frog in the British Museum collected by Mr. J. Hewitt at Kuching, N. Borneo, one specimen of which is sufficiently developed to confirm the identification with tolerable certainty. They differ entirely from the tadpole of *Chaperina beyeri* (=*Sphenohryne fusca*), which has been described by Taylor in having a sinistral spiraculum and ? ranid type of mouth (Philippine Amphibia, 1920, p. 34), neither of which characters have so far been associated with the brevicipited larvae.

The following description is drawn up from Mr. Hewitt's tadpoles:—Length of head and body 1½ to 1¾ times its breadth, considerably depressed; snout very broadly rounded. Eyes superolateral, the distance between them twice that between the nostrils, which are midway between the tip of the snout and a line drawn between the eyes. Spiraculum ventral the opening being in the mid-line at the junction of the anterior three-quarters and the posterior one-quarter of the head and body. Mouth terminal, without horny beak or labial teeth, consisting of a simple upper and lower lip, the latter being composed of a transverse flap which appears to represent the true lip, and an internal notched portion which is joined at its apex to the transverse part in the mid-line. Anus dextral. Tail 1½ times as long as the head and body, the tip obtusely pointed: crests moderate, sub-equal. Colour olive brown, paler below. Total length 24 mm., head and body 9 mm.

Genus **Microhyla**

Boulenger, p. 258; Parker, Ann. Mag. Nat. Hist., (10) II, 1928, p. 473.

Parker has recently reviewed this genus very completely. His findings shew that a complete orthogenetic series can be traced from the most primitive forms (*M. berdmorei* and its allies) in which the palatine bone is well developed, the digital discs large with T-shaped terminal phalanges and the toes fully webbed, to *M. inornata* in which the palatine has completely disappeared, the digital extremities are merely swollen with simple terminal phalanges, and the toes entirely free of web.

Tadpoles with lateral eyes, median-ventral spiraculum and a terminal mouth, which is provided with a small upper and a contractile lower lip; no horny jaws or teeth. Tail usually terminating in a fine filament. The toes are fully webbed in the larval state. The food of these creatures consists of minute organisms suspended in the water, except in the case of *M. heymonsi* and *M. achatina* which feed by suction at the surface.

Two species are added to the fauna of the peninsula. *M. pulchra* (Hallow) has been obtained at Patiyu just north of the Isthmus of Kra, and probably occurs in the region included in this work.

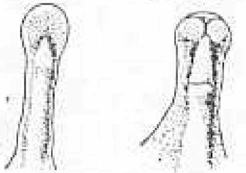

Fig. 13. Digital extremities of *Microhyla palmipes* and *M. berdmorei*.

KEY TO THE SPECIES

I. Tips of toes with distinct discs, the upper surface of which is divided from the lower by a marginal groove.

A. Upper portion of disc with a median notch in front.

Toes webbed to the discs; two metatarsal tubercles. A palatine bone … … *berdmorei.*

Toes $\frac{2}{3}$ to $\frac{3}{4}$ webbed; no outer metatarsal tubercle; first finger less than half the length of second. A palatine bone … … *annectens.*

Toes $\frac{1}{3}$ webbed; two metatarsal tubercles; a dark Λ-shaped mark on the back. A palatine bone … … … … *butleri.*

Toes webbed at the base; two metatarsal tubercles; a continuous dark band along the side of the body. No palatine bone … … *heymonsi.*

B. No notch on the upper half of the disc.

Toes $\frac{2}{3}$ – $\frac{3}{4}$ webbed; no superciliary spine; fingers with distinct discs. A palatine bone … *palmipes.*

Toes nearly fully webbed; a dermal spine on the upper eyelid; fingers without discs. A palatine bone … … … … *superciliaris.*

II. Tips of toes merely swollen.

Toes with a rudiment of a web: two metatarsal tubercles; back with a large V-shaped mark, more or less distinct. No palatine bone … *ornata.*

Toes free; a single metatarsal tubercle; back uniform or with irregular black spots. No palatine bone … … … *inornata.*

Microhyla berdmorei.

Boulenger, p. 263; M. A. Smith, Journ. F. M. S. Mus., X, 1922, p. 28 (Pahang) and Rec. Ind. Mus. XXVI, 1924, p. 141, pl. VII; Parker, Ann. Mag. Nat. Hist., (10) II, 1928, p. 479.

Tadpole. Head and body together squarish in shape, only a little longer than broad. Eyes eight times as far apart as the nostrils. Tail not more than twice the length of the head and body, not terminating in a filament; crest low, subequal.

Total length 23 mm.; head and body 9 mm.

Colour greyish or brownish, semitranslucent.

Microhyla annectens

Boulenger, p. 262; Parker, Ann. Mag. Nat. Hist., (10) II, 1928, p. 482.

I have seen a specimen from Patiyu, just north of the Isthmus of Kra.

Microhyla butleri.

Boulenger, p. 261; M. A. Smith, Journ. N.H.S. Siam, II, 1917, p. 268 (tadpole) and Journ. F. M. S. Mus., X, 1922, p. 281 (Pahang); "Transparent tadpoles" Flower P.Z.S. 1899, p. 903, pl. LX; Parker, Ann. Mag. Nat. Hist., (10) II, 1928, p. 483

Tadpole. Length of head and body about $1\frac{1}{2}$ times its width. Nostrils close together on the upper surface of the head; distance between the eyes about 6 times that between the nostrils.

Tail about three times as long as high, terminating in a fine filament. Crests well developed, curved in outline, the lower one higher than the upper.

Head and body semitransparent, finely speckled with brown. Crests of the tail reddish-brown or scarlet, the coloration terminating abruptly with a margin of dark, sometimes black pigment, before the end of the tail is reached.

The range of this frog extends into Burma (S. Shan States).

Microhyla heymonsi.

Microhyla achatina, (part), Boulenger, p. 261; *Microhyla achatina*, M. A. Smith, Journ. N.H.S. Siam, II. 1916, p. 37, fig (tadpole) & p. 169; Robinson and Kloss, Journ. F. M. S. Mus., V. 1915, p. 155.

Microhyla heymonsi Vogt., SB. Ges. Nat. Fr. 1911, p. 181; Parker, Ann. Mag. Nat. Hist., (10) II, 1928, p. 487.

Parker has shewn that the true *achatina* is confined to Java and the form which is found in the Malay Peninsula and over the greater part of the Indo-Chinese region is *heymonsi*. It was first described from specimens obtained in Formosa.

Tadpole. Length of body $1\frac{3}{4}$ to nearly 2 times its breadth. Distance between the nostrils about $\frac{1}{4}$ the distance between the eyes. Tail twice the length of the head and body, 3 to 4 times as long as high, the tip terminating in a fine filament; crests moderate, subequal.

Lower lip greatly enlarged forming when elevated a cup-shaped receptacle into which are drawn by suction all minute particles of matter which happen to be floating on the surface of the water in the vicinity.

Brownish, with a gold spot on the head between the eyes and often gold or orange patches on the sides of the body and tail.

Total length 22 mm.; head and body 7 mm.

Microhyla palmipes.

Microhyla annectens (part), Boulenger, p. 262.

Microhyla palmipes, Boulenger, Ann. Mag. Nat. Hist., (6) XIX, 1897, p. 108; Parker. Ann. Mag. Nat. Hist., (10 II, 1928, p. 485

Microhyla berdmorei, M. A. Smith, Journ. F. M. S. Mus., X, 1922, p. 281.

Habit slender, snout rounded, slightly prominent, as long as or slightly longer than the diameter of the eye; interorbital space broader than the upper eyelid. Tips of fingers and toes dilated into small but distinct discs with a marginal groove separating the upper and lower surfaces; no notch on the upper surface; fingers slender, first much shorter than second which is about equal to the fourth; toes $\frac{2}{3}$ to $\frac{3}{4}$ webbed; two metatarsal tubercles; the tibiotarsal articulation reaches to the tip of the snout or just beyond. Skin smooth or slightly tubercular above; usually a small tubercle on the posterior half of the upper eyelid.

Greyish or purplish-brown above, with symmetrical dark, light-edged markings, namely a triangle between the eyes connecting with a large Λ -shaped mark on the back; a dark oblique band from the eye to the middle of the flank; anal region black; limbs with dark cross-bars, usually two across the thigh, one across the tibia and one on the tarsus; lower parts whitish or brownish.

From snout to vent 18 mm.

Range. Java, Nias, Sumatra and the Malay Peninsula, where it has been found in the Batu Caves at Kuala Lumpur.

Microhyla superciliaris.

Parker, Ann. Mag. Nat. Hist., (10) II, 1928, p. 486.

Habit slender. Snout rounded, slightly prominent, slightly longer than the diameter of the eye. Tips of digits dilated; of the fingers scarcely at all, of the toes larger, with a marginal groove separating the upper and lower surfaces; no notch on the upper half of the disc. First finger much shorter than the second, which is about as long as the fourth; third finger twice or more than twice as long as the second; toes slender, almost fully webbed, the membrane extending to the discs of all except the fourth; subarticular tubercles, scarcely distinct; two metatarsal tubercles. The tibiotarsal articulation reaches to the tip of the snout. Skin smooth above and below; a prominent dermal spine on the upper eyelid.

Colour in alcohol (specimen rather bleached). Yellowish-brown above with indications of a dark Λ -shaped mark on the back, its apex on the shoulders; a dark oblique streak from the eye to the middle of the flank; anal region black; limbs with dark cross-bars, namely two across the thigh, one across the tibia and one on the tarsus; lower parts whitish.

From snout to vent 12 mm.

Type specimen, a female, was collected in the Batu Caves, Kuala Lumpur in 1904. There is a second female specimen in the Museum of Zoology, Amsterdam, collected at Deli, Sumatra.

Microhyla ornata.

Boulenger, p. 260, Parker, Ann. Mag. Nat. Hist., (10) II, 1928, p. 493.

Microhyla inornata.

Boulenger, p. 259, M. A. Smith, Rec. Ind. Mus., XXVI. 1924, p. 141 (tadpole); Parker, Ann. Mag. Nat. Hist., (10) II, 1928, p. 498.

The tadpole is indistinguishable from that of *M. ornata*.

Range. Southern Burma, Siam, Cochin-China, the Malay Peninsula and Sumatra. Parker unites the Formosan *M. stejnegeri* with this species.

Family **Bufonidae**

Genus **Nectophryne**

Nectophryne guentheri, Boulenger, p. 268.

Nectophryne hosii, Boulenger, p. 268.

My native collector found this toad common in the vicinity of the Setun river (Lat. 7° 40 N.) and obtained a large series. He was attracted to the spot after dark by the voices of the males as they were clambering about on bushes and small trees.

Genus **Bufo**

One species, *B. macrotis*, is added. *B. jerboa* becomes *B. borbonica*.

Bufo penangensis. = [illegible]

Boulenger, p. 270; M. A. Smith, Journ. F. M. S. Mus., X. 1922, p. 282 (Kuala Teku).

Robinson and Kloss found this species common at Tasan (Isthmus of Kra) and I obtained it at Benang Star in Patani, and in the Nakon Sritamarat mountains.

The tadpole is figured on p. 111 (text-fig. 6).

Bufo borbonica.

Hylaplesia borbonica, Kuhl & van Hasselt, Isis, XX. 1827, p. 294.

Nectophryne borbonica, van Kampen, Amphib. Indo-Austral. Archipel., p. 70 fig. (1923).

Bufo borbonica, M. A. Smith, Journ. Sarawak Mus., III. 1925, p. 30. (*jerboa=borbonica*).

Bufo jerboa, Boulenger, p. 271.

I have examined a large series of this toad from Kuan Nieng, S. W. of Patelung.

My reasons for placing it under *Bufo* rather than under *Nectophryne*, as van Kampen has done, have already been given (1925).

Dr. van Kampen has kindly compared for me specimens of *Bufo jerboa* with the types of *Hylaplesia borbonica* and confirms my opinion that the two should be united.

Bufo macrotis.

Boulenger, Fauna Brit. India, p. 502 (1890); M. A. Smith, Journ. N.H.S. Siam, II. 1916, p. 169 (Patani).

Habit moderately stout. Crown without bony ridges; snout short truncate; interorbital space flat, as broad as the upper eyelid; canthus rostralis distinct; loreal region oblique; tympanum very distinct, vertically oval, quite as large as the eye and close to it.

Tips of fingers and toes swollen; first finger as long as or a little longer than second; toes barely half webbed with irregular spinose tubercles beneath, from which the subarticular tubercles are hardly distinguishable; two small metatarsal tubercles, the outer the larger; the tarsometatarsal articulation reaches to the tympanum or the eye.

Upper parts studded with round tubercles of various sizes; parotids prominent, subcircular.

Brownish or greyish above with irregular darker markings and occasional jet black spots; upper lip and limbs with indistinct dark bars present or absent. Lower surfaces dirty white, uniform or spotted with brown.

From snout to vent 52 mm.

Male with a subgular vocal sac, and black asperities on the inner two fingers during the breeding season.

Range. Burma, Siam and the northern part of the Malay Peninsula. A single example has been obtained at Muang Sai, Patani.

Easily distinguished from the other two species in the Peninsula that have no bony ridges on the head by the stouter habit and much shorter hind limbs and prominent parotid glands.

Bufo asper.

Boulenger, p. 272; van Kampen, Nat. Tijdschr. Ned-Indie, LXIX, 1910, pp. 26, 30, pl. II (tadpole); M. A. Smith, Journ. N.H.S. Siam, II. 1916, p. 170 (P. Siam) and Journ. F. M. S. Mus., X. 1922, p. 283 (Pahang).

Tadpole. Length of head and body about 1½ times its breadth; nostrils nearer the eye than the tip of the snout; eyes superolateral, their interspace about 1½ times the distance between the nostrils; spiracle sinistral, directed backwards, midway beween the eye and the vent, which is medium. Tail 1½ times as long as the head and body, with rounded tip; crests low. the upper a little deeper than the lower, not reaching the base of the tail. Mouth ventral, very large, shaped like a sucker, sides and lower lip with a single series of short papillae; mandibles edged with black, the upper **M**-shaped; upper lip with two uninterrupted series of teeth; lower lip with three series, its posterior portion which is unarmed extending backwards nearly to the middle of the body.

Length 20 mm. Colour blackish.

This description of the larva is taken from van Kampen (1910). Three tadpoles without budding hind-limbs which I assign to *Bufo asper* were obtained by Mr. C. Dover in Sungei Ampang, Selangor in 1926 (see text fig. 6, p. 111).

Robinson and Kloss found this toad abundant at Tasan (Isthmus of Kra). It is common also in the Nakon Sritamarat mountains.

Bufo melanostictus, Boulenger, p. 272.

Bufo parvus.

Boulenger, p. 274; M. A. Smith, Journ. N.H.S. Siam, II. 1916, p. 42, fig. (tadpole) and p. 170 (P. Siam) and Journ. F. M. S. Mus., X, 1922, p. 283 (Kuala Tahan).

Tadpole. Length of head and body 1⅓ to 1½ times its breadth; eyes superolateral, the distance between them twice that between the nostrils. Tail 1⅓ times the length of the head and body, 3 times as long as high, the tip rounded; crests moderate, subequal.

Mouth subterminal; beak edged with black; upper lip with 2 and lower lip with 3 long series of uninterrupted teeth.

Length 25 mm.; head and body 10 mm. Colour blackish.

Bufo quadriporcatus, Boulenger, p. 274.

Bufo divergens, Boulenger, p. 275.

Genus **Pseudobufo**

Nectes, p. 275.

Pseudobufo Tschudi, Mém. Soc. Sc. Neuchatel, II. 1839 pp. 49, 87; Nieden, SB. ges. nat. Fr. Berlin, 1914, p. 369.

Pseudobufo subasper.

Nectes subasper, Boulenger, p. 275; van Kampen, Amphib. Indo-Austr. Archipel., 1923, fig. 10.

Family **Pelobatidae**

Genus **Megophrys**

Megalophrys, p. 276.

Megophrys, Khul en van Hassett, Isis, 1822, p. 475.

M. montana var. *aceras* Boulenger, I regard as a distinct species.

The tadpoles of this genus can be sharply divided into two groups, namely, those with horny mandibles and teeth of the ranid type and those without mandibles and teeth, but with the lips modified to form a cup-shaped orifice by which they obtain their food by suction from the surface of the water. The function of this "funnel" has been recently discussed by me in P.Z.S. 1926, pp. 983 – 987.

Megophrys nasuta.

Megalophrys nasuta, Boulenger, p. 279; M. A. Smith, Journ. F. M. S. Mus., X. 1922, p. 282 (Wray's Camp).

Patani at present marks the northern range of this species.

Megophrys longipes.

Megalophrys longipes, Boulenger, p. 280; M. A. Smith, Journ. F. M. S. Mus., X, 1922, p. 282 (Fraser's Hill).

Two specimens were captured on Khao Luang in the Nakon Sritamarat mountains at 4,000 feet altitude.

Megophrys aceras.

Megalophrys montana var. *aceras*, Boulenger, Fascic Malay., Zool. I. p. 131, pl. V (1903).

Megalophrys montana (part), Boulenger, Fauna, p. 277.

Megalophrys aceras, M. A. Smith, P.Z.S. 1926, p. 987

Tongue entire or feebly nicked behind; vomerine teeth in prominent rounded groups extending to behind the level of the choanae widely separated from each other. Head 1⅓ to 1½ times as broad as long; snout obtusely pointed, strongly projecting beyond the lower jaw, as long as the eye; canthus rostralis sharply defined; loreal region vertical, slightly concave; nostril nearer the tip of the snout than the eye; interorbital region concave, broader than the upper eyelid; tympanum very distinct, ¾ the diameter of the eye.

Fingers and toes rather long, the tips swollen; first finger longer than the second; no distinct subarticular or metacarpal tubercles. Toes webbed at the base; an oval flat inner metatarsal tubercle, ¾ the length of the inner toe; a dermal fringe along the under surface of the fingers and toes usually present.

The tibiotarsal articulation reaches to between the tympanum and the eye in the adult, a little farther in the young.

Skin smooth with fine, scattered tubercles, those on the flanks longer than those on the back. A fine glandular **V**-shaped fold upon the neck and usually another opposing it on the back; a fine fold along the side of the body from the tympanum to the groin; a strong, curved supratympanic fold, continued along the border of the upper eyelid where it is produced into a small horn, and along the canthus rostralis to meet its fellow of the opposite side in a distinct tip.

Bronze brown or greyish above with darker markings, the most conspicuous being a triangular patch between the eyes; flanks and hinder side of limbs with black spots; an irregular black band along the back of the thigh enclosing the anus; limbs with dark cross bars. Yellowish below, the throat and chest marbled with brown.

From snout to vent ♀ 83 mm., ♂ 57 mm.

Tadpoles of the "funnel-mouth" form.

Range. The Malay Peninsula (Patani, Nakon Sritamarat).

Distinguished from *M. monticola* by the narrow head, larger and more distinct tympanum and feebler web to the toes.

As stated by me in P.Z.S. 1926, *M. montana* has now no place in the fauna of the Peninsula.

Megophrys gracilis.

Megalophrys gracilis, Boulenger, p. 281.

Megophrys heteropus.

Megalophrys heteropus, Boulenger, p. 281.

Megophrys pelodytoides.

Megalophrys pelodytoides, Boulenger, p. 282; M. A. Smith, Journ. N.H.S. Siam, II. 1917. p. 272, fig. (tadpole).

Tadpole. Length of head and body 1¾ to 2 times its breadth, considerably depressed. Eyes superolateral, a little farther apart than the nostrils. Tail twice as long as the head and body, 4 to 5 times as long as high, the tip obtusely pointed; crests low, subequal.

Mouth subterminal, entirely surrounded with papillae; beak black; upper lip with 5 or 6 series of teeth, the outer very short, the second much longer and narrowly interrupted, the remaining 3 or 4 broadly interrupted; lower lip with 4 series, the outer uninterrupted.

Light or dark brown, speckled and spotted with black.

Total length 63 mm.; head and body 21 mm.

Megophrys hasseltii.

Megalophrys hasseltii, Boulenger, p. 282.

Tadpole. Length of head and body 1½ times its breadth, moderately depressed. Eyes superolateral, about twice as far apart as the nostrils. Tail 1½ to 2 times the length of the head and body, 3 to 4 times as long as high, the tip obtusely pointed. Crests moderate, the upper a little higher than the lower.

Mouth subterminal, surrounded with papillae except for a small gap in the midline above. Beak black; upper lip with 6 or 7 series of teeth, the outer short, the second much longer, the remainder interrupted by the beak; lower lip with 5 or 6 series, the inner 3 of which are paired.

Colour (of specimens in the Peninsula). Dark greyish, covered all over with black, punctate dots.

Total length 46 mm.; tail 24 mm.

Order **APODA**

Family **Caeciliidae**

Ichthyophis glutinosus, Boulenger, p. 285.

Ichthyophis monochrous, Boulenger, p. 286.

NOTES

Page 36. **Lygosoma opisthorhodum.**

Description: Snout short; lower eyelid scaly; ear-opening small, round. Supranasals present, forming a median suture; frontonasal broadly in contact with the frontal; latter more than one time and a half as long as broad, in contact with the two anterior supraoculars; four supraoculars; frontoparietals and interparietal distinct; parietals forming a suture behind the latter; no temporals; fourth or fifth upper labial below the eye. Body with 30 scales round the middle, dorsals and laterals tricarinate, ventrals smooth, in 10 longitudinal series; praeanals feebly enlarged. Tail slightly longer than head and body. Limbs short, not meeting when adpressed; fourth toe with 13 lamellae below.

Blackish-brown above, posteriorly somewhat lighter; tail reddish-brown; a light stripe beginning at the frontal, passing along the upper eyelid to the flanks, where it is lost; lower labials brown. Lower parts yellowish-brown. Length of head and body 93 mm.; tail broken. (After Werner).

Page 92. **Ooeidozyga laevis.**

In a forthcoming paper in the Bull. Raffles Mus. I show that *Ooeidozyga laevis* is generically distinct from *O. lima* and congeneric with *Oreobatrachus baluensis* Boulenger. The name *Phrynoglossus* Peters, is available for these species and all those at present included under *Ooeidozyga* except *O. lima*. *Ooeidozyga* becomes a monotypic genus.

Page 124. **Sphenophryne fusca.**

In a paper not yet published Mr. H. W. Parker has recognised *Chaperina* as a monotypic genus.